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ABSTRACT

The document contains the final report on the Gifted Science Project in Montgomery County, Maryland, a program to provide resources for gifted students in grades 3-8 who are motivated in science. The primary product is a microfiche file (the Project Resource File) listing people, places, and published materials that can be used by individual students. Twenty-seven chapters address such program components as: need for the grant, data storage, science project objectives, staffing, the Project Resource File, evaluation, preparation of the Project Resource File for microfiche, the Project Resource File: experience with users, recommendations for in-service training, identification of the gifted and talented, the final state of the Gifted Science Project, the future of the Gifted Science Project, and final recommendations. Appendixes which make up over half the document include a paper on the goals of education, a summary sheet on the Gifted Science Project, resource categories and examples in the Project Resource File, project objectives, and an example of a Project Resource File Index Sheet. (SW)

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MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

FINAL REPORT ON THE GIFTED SCIENCE PROJECT

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August 1, 1980

Edward Andrews
Superintendent of Schools

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EXECUTIVE SUMMARY

OVERVIEW

The Gifted Science Project (GSP) of Montgomery County Public Schools (MCPS) was federally funded for three years, 1977-1980, under the Elementary and Secondary Education Act (ESEA), Title IV-C, Grantor Project Number 30-77-3-16-0039. The project's purpose was to build a resource bank to enrich science studies of individual students in Grades 3-8. The GSP is not a curriculum, nor do its resources include standard science content materials. Instead, it provides resources students can use autonomously or with assistance from adults to complete science projects, investigate science-related careers, and pursue activities to enhance their comprehension of scientific processes and laboratory skills.

On the basis of his 25 years of experience in science education, the GSP director knew that there is a dearth of such materials and opportunities for students in Grades 3-8. In contrast to senior high school science students, who have a very wide variety of opportunities available, students in the elementary and middle grades are offered few opportunities outside the classroom to enrich their science studies. And, as was confirmed by literature searches later conducted by the GSP staff, the director also observed a shortage of materials students could use independently to explore various principles of science. Therefore, the project was developed to provide such materials and opportunities to students in Grades 3-8.

The resources compiled by the GSP are specifically intended for individual students who are not only gifted but also strongly motivated to study scientific questions. Resources include information on scientific careers, agencies and laboratories, published materials, and special activities such as science awards, competitions, and fairs. Also included are local scientists, engineers, and medical professionals who have agreed to function as mentors to individual students with an interest in their area of expertise.

Eligible students are selected according to published MCPS procedures. A teacher or other staff member then interviews the student to determine the student's degree and focus of interest in science. With this knowledge, the adult then uses the Project Resource File (PRF) to locate appropriate resources for the student and makes arrangements for the student to use these resources.

Once funding was obtained, the GSP director, who also functions as the secondary science coordinator for MCPS, hired staff members skilled in the areas of science, research, media, and typing. After conducting research to determine the availability of similar materials in other districts, the staff began the task of building its resource bank, the PRF. Considerable effort was exerted in obtaining community resources (local scientists willing to serve as mentors; scientific agencies, laboratories and libraries willing to assist individual students; and opportunities for science competition, courses, and lectures). The GSP staff

also compiled a wide variety of published materials for use by individual gifted students. These materials include books, kits, and media packages that present science-related career information, ideas for science projects, and information on developing skills related to tha processes of science.

Because MCPS schools have microfiche readers and the cost of this medium is far lower that that of print, the PRF is reproduced on microfiche. A description of each resource was typed on a separate sheet of paper, and these sheets were arranged for reproduction according to topic.

Fifteen public schools and one Catholic school were chosen for the pilot stage of the project. A number of in-service sessions and methods were used to train local school staff to use the PRF. When the GSP staff found that the PRF was receiving very limited use in schools, the staff undertook the tasks of interviewing students, selecting appropriate resources, and arranging for their use. From this experience it appears that inceased in-service at local schools, increased support from central and area office staff, and the use of aides or parent volunteers would be helpful to insure that these resources are adequately exploited by the students for whom they are intended.

MCPS provided funds for the limited purchase of books and other materials to support the goals of the project. GSP staff assumed responsibility for compiling bibliographies of available materials, providing the bibliographies to the schools so that they could make selections, and processing and disseminating the materials once they arrived.

The GSP staff also developed a methodology for evaluating the project. One or more reports were completed by all students, teachers, and resource persons who were actively involved in the project. In addition, feedback was received from the principals and media specialists of the tryout schools. Findings of the evaluation included a large increase in the use of resources during the project tryout compared to the previous year, positive experiences reported by students who used resources, and ambivalence on the part of teachers concerning the tradeoff of benefit to students and time required. A number of recommendations were received for improving project materials and services, and these were incorporated into revisions to the PRF for 1980-1981.

PROBLEMS

As would be expected in any similar undertaking, the GSP encountered a number of problems during its three-year development period. Staff turnover naturally caused interruptions in the flow of activities. In addition, the director, who assumed this responsibility in addition to his regular duties, found that the GSP demanded more time and attention than he had anticipated, leading him to conclude that administration of such a project should be assumed by a full-time director.

The GSP staff was also distracted by requests from parents and others in MCPS for materials and resources before these resources were compiled and developed.

Frustrations were also encountered during the project's tryout period. Teacher resistance occurred both in response to the large number of required evaluation reports and in response to the amount of time it took to arrange for student use of project resources. Although some published materials were obtained for each tryout school, many of the items in the PRF were not in the school collections. Problems also occured when teachers ignored agreements with resource persons and provided their names and telephone numbers to students and parents since agreements had specified that only MCPS staff would make initial contacts and arrangements with these people. The constraints of teacher time led the GSP staff to simplify the PRF and procedures for its use. The GSP staff also recommends that similar projects consider providing increased in-service and encouraging the use of aides or volunteers to assist teachers in arranging for students to use the resources of the PRF. Sufficient funding should be planned to provide the published materials to each school.

ACCOMPLISHMENTS

The staff believes, however, that the GSP has accomplished a great deal during its developmental period and that the GSP can be used as a model for other similar projects for a variety of grade levels, subject areas, special populations, and general programs.

It provides resources for the younger student whose intellect is still developing and whose career choices have not yet been made. It provides these students opportunities to explore numerous topics in a wide variety of ways.

Though the project does not present curriculum, it helps teachers in regular classrooms (as well as in programs for the gifted and talented) to use resources with existing curricula. Resources are coded according to grade level, topic, and objective within the MCPS Science Instructional System.

The project created operating definitions for nine resource categories, then stored information about these resources in a retrievable form. This practical and useful system has the potential for application to many other projects.

By recruiting female and minority resource persons, the GSP staff took steps to insure that female and minority students would be provided with strong role models. The staff also was careful to be sure that any obstacles a handicapped student could encounter in using a resource are clearly described and that the safety of any student in potentially dangerous situations is guaranteed.

The GSP developed a standardized procedure for recruiting resources and developed criteria, albeit subjective, to evaluate the usefulness of published materials. Materials selected encourage students to be actively involved in exploring science processes, projects, and careers.

FUTURE

A continuation grant for 1980-81 will support in-service training for the continued dissemination of the PRF to additional schools. All MCPS schools will have access to the resources of the PRF. No additional staff are being requested to administer the program in the future. Existing staff, including science coordinators, resource teachers, and teacher specialists for science and gifted and talented programs, should be able to incorporate implementation of the project into their normal duties. The PRF will be updated every two years by part-time summer staff.

SUMMARY

In summary, although the GSP encountered predictable problems, it accomplished a great deal. Not only will gifted MCPS science students benefit from this resource bank for many years to come, but it is also hoped that other school systems will be able to exploit the experience of this project in order to develop similar projects of their own.

Additional information about the history, evaluation, and other products of the project can be obtained by writing or calling the project director.

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MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

FINAL REPORT
ON THE
GIFTED SCIENCE PROJECT

August 1, 1980

Edward Andrews
Superintendent of Schools

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FOREWORD

The Gifted Science Project was created to fill a need identified in Montgomery County to provide resources for gifted students in Grades 3-8 who are motivated in science. We are pleased to offer this report, which documents the history of the project and offers specific suggestions on replicating it in other grades or subject areas.

Edward Andrews
Superintendent of Schools

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Office of the Associate Superintendent for Instructional Services
Department of Instructional Planning and Development
Division of Academic Skills
Department of Personnel
Department of Budget
Department of Federal, State, and Private Grants
Division of Procurement
Division of Accounting
Division of Instructional Resources
Publications Services
Area administrative staff, including specialists for elementary science and gifted and talented education

Special recognition is given to the following persons for their specific contributions to the project:

Gerard Consuegra, David Dubois, Michael Lawson, and Susan Ott, who had major responsibilities for creating and implementing the project.

Terri Baumgardner, Peg Fagley, and Karen Yount who typed intermediate and final versions of project products.

Dr. Elizabeth Wilson, former director, Department of Curriculum and Instruction, who identified the opportunity for the project and who helped to write the proposal.

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Scientists, engineers, and other professional persons in the community who have earnestly committed themselves to the project by serving as mentors, identifying other mentors, and arranging for individual gifted science students to participate in specialized activities, courses, and visits.

Most important, the principals, media specialists, teachers, parents, and students of the tryout schools who helped to develop, use, and evaluate the resources obtained by the project.

The primary goal of the project was to provide science resources for students. It is hoped that the materials and procedures described in this report have met this goal. The final proof, however, will be the satisfaction of students and teachers who have used the project's resources.

Persons who have comments or suggestions regarding the report or who desire more information are invited to write to the project director.

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A NOTE TO THE READER

The Gifted Science Project staff pursued a number of tasks simultaneously throughout the grant period. This fact made a strictly chronological approach to this report neither feasible nor useful. Consequently, the writers have presented the information basically in chronological order but have grouped topics together where necessary for clarity.

Throughout this report, description sections are followed by recommendation sections. This format seemed more logical to the writers than summarizing all recommendations at the conclusion of the entire report, where they would be disconnected from the experiences that prompted them.

Two kinds of objectives are mentioned in this report: the objectives of the Gifted Science Project itself; and the instructional objectives for science, developed by Montgomery County Public Schools (MCPS). MCPS is currently in the process of revising its science objectives. These revised objectives are collectively called the Science Instructional System (SIS) and will be incorporated into the MCPS Program of Studies during the 1982-83 school year. In anticipation of this change in the MCPS curriculum, the Gifted Science Project staff decided to code project resources to the new SIS objectives rather than match resources to objectives in the older Program of Studies.

For the reader's convenience, these four abbreviations, which are used throughout this report, are given in full:

1. GSP: Gifted Science Project
2. MCPS: Montgomery County Public Schools
3. PRF: Project Resource File
4. SIS: Science Instructional System

There are four companion documents to this report:

1. Evaluation Report on the Gifted Science Project
2. In-service Manual
3. User's Manual
4. Bibliographies of published materials

These documents can be obtained by contacting

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I. GENERAL INTRODUCTION TO THE GIFTED SCIENCE PROJECT

Parents and teachers are constantly searching for science resources that will enrich the studies of gifted students beyond the classroom. Such resources are widely available for high school and college students but are generally difficult to locate for elementary and junior high school students. The Gifted Science Project (GSP) was proposed to locate and make available these science resources for gifted students in Grades 3-8.

The project identified and disseminated listings of (a) community science resources (people and places) and (b) published science materials. Community resources include local scientists, scientific agencies, laboratories, specialized science libraries, opportunities for science competition, and science courses. Published materials include books, kits, and media packages that provide career information, ideas for science projects, and information on developing skills in the processes used in science. These resources are coded to the grade levels, topics, and objectives of the Montgomery County Public Schools (MCPS) Science Instructional System (SIS). The resources are described on individual information sheets that have been reproduced on microfiche, a form of microfilm. As a group, the resources are referred to as the Project Resource File (PRF).

No curriculum development is associated with the Gifted Science Project. The project's objective was limited to identifying and disseminating available science resources.

The GSP supports the MCPS document The Goals of Education, the Board of Education statement A Policy Statement on Education of Gifted and Talented Students, and the MCPS Program of Studies. (Copies of the first two documents are included as appendixes A and B.)

II. THE NEED FOR THE GRANT

The gifted student population in the Montgomery County Public Schools (MCPS) totals approximately 25 percent of the school enrollment, if the liberal criterion of an IQ of 120 or greater is employed. At the time the GSP was proposed, there was no systemwide science program that was designed specifically to meet the needs of gifted children in upper elementary, middle school, and junior high grades.

Since 1973 there had been increasing community concern over the general efforts of the school system on behalf of gifted and talented students. In response to several reports from the Committee on the Gifted of the Montgomery County Council of Parent Teacher Associations, a superintendent's report, dated November 1974, entitled "Instruction of the Academically

Gifted in MCPS," was reviewed by the MCPS Board of Education. This report stressed the need for a systemwide plan for the instruction of academically gifted students in every county school. In January 1975 the Task Force on the Academically Gifted in MCPS stated that education of the gifted would be identified as a priority area of concern and MCPS would take appropriate steps to develop a systemwide plan that assured provision for the gifted in every school. The position of coordinator for gifted and talented education was established; and a five-year plan was developed to build a variety of educational programs, support systems, alternatives, and supplementary centers for gifted students in grades K-12.

During this period, teachers and school administrators responded enthusiastically to various MCPS staff efforts to improve instruction for the gifted. In-service courses, institutes, workshops for teachers, and leadership conferences for principals and other school system leaders on gifted and talented education were well attended and were widely viewed as opportunities long overdue.

The decision to focus a proposal request on science was made as the result of two factors, which converged as grant money for project development became available: (a) the extensive experience of the secondary science coordinator with the needs of gifted students in Montgomery County and (b) his idea for a project to meet those needs. In his previous position as elementary science coordinator, as well as in his current position as secondary science coordinator, he had received numerous requests for additional science resources for elementary and junior high school children who wished to extend their classroom studies. Serving these children was extremely difficult because of age restrictions in many laboratories and facilities and because of the reluctance of some scientists and other science-related professionals to work with young children. Consequently, few resources for students in Grades K-8 were available to provide enrichment experiences in science.

With the knowledge that state and federal grant money for project development was available, the secondary science coordinator outlined a project that involved obtaining resources for elementary and junior high students--persons who would work with the students, places to visit, and titles of published materials. A resource file would be designed with separate categories to describe each type of resource. He envisioned the project as providing opportunities for gifted students to explore topics in depth as well as to develop higher cognitive skills. Thus the Gifted Science Project was conceived, and a proposal was written.

The decision to concentrate efforts on Grades 3-8 was based on a judgment concerning the students of MCPS who needed the most immediate support. An environmental guide for the gifted had recently been completed for Grades K-2, and a variety of options existed for Grades 9-12 (advanced placement courses, internships, and science fairs). Thus, it was determined that students in Grades 3-8 had the greatest need for science resources and enrichment opportunities.

III. THE STORAGE OF DATA

Convenient identification and retrieval of resource information was considered essential from the beginning of the project. Because microfiche is an inexpensive and convenient way to store large quantities of data, and because all MCPS schools have microfiche readers, it was logical to choose this method of information storage.

The resource description sheets that comprise the PRF were identified by unique code numbers. The numbering system was developed in anticipation of a computerized retrieval and data management system. These code numbers appear on the first two editions of the PRF and were useful for completing the evaluation phase of the project. The code numbers were dropped from the final PRF edition since the evaluation phase of the project had been completed and a computerized retrieval system was no longer planned. The system for assigning numbers has been revised based on experiences with managing data regarding the resource description sheets and could be implemented in future editions if judged useful.

IV. GIFTED SCIENCE PROJECT OBJECTIVES

The GSP proposed to evaluate two categories of objectives: developmental and evaluative. Nine developmental objectives outlined tasks to be carried out. Nine evaluative objectives outlined procedures for monitoring and evaluating the results of implementing the project. These GSP objectives and the evaluation instruments used to study them are discussed later in this report. The GSP objectives appear in Appendix N.

V. PROPOSAL SUBMISSION

The proposal, outlining a 3-year project, was submitted under ESEA Title IV-C in spring 1977. The estimated cost for each of the 3 years was $87,000, $85,000, and $82,000, respectively. The proposal was accepted and staffing began in July 1977. The actual allocations for the project were $86,832 for the first year, $85,880 for the second, and $88,253 for the third.

VI. STAFFING

A. PROCESS

The MCPS secondary science coordinator assumed the job of directing the GSP in addition to his regular administrative duties. This benefited the project by reducing the number of staff paid with grant funds. Additional staff were sought who were both trained in science and familiar with the MCPS Program of Studies, since the key product of the GSP was to be a resource file coded to MCPS science instructional objectives. Fortunately, three highly qualified persons were found within the MCPS system. These persons plus a secretary were hired with grant funds and began work in August 1977. (Staff members and descriptions of their responsibilities are listed in appendix C.)

B. RECOMMENDATIONS

Certain skills are essential to any project designed to identify and make available existing community and published resources. These skills would be included in the following positions:

1. A director to coordinate the overall project and work with budget, payroll, and personnel

2. A subject matter specialist to locate and gather resources, write descriptions of resources and training materials, and conduct in-service presentations for school personnel

3. A person with media technology skills to locate and collect published materials, prepare resources and disseminate them to schools, and help prepare and present in-service training

4. An expert secretary.

In addition, if the school system requires an evaluation of the project, a person with research and evaluation skills is necessary.

All professionals should be thoroughly familiar with the subject-matter field for which the project is planned and be able to write clearly. For a large project similar to the GSP, the experience of the project staff indicates that adequate staffing is essential. For a smaller project the necessary skills may be combined in persons who possess more than one area of expertise.

One option for a smaller project would be to create a single position combining the duties of director and subject matter specialist. It would be essential for the person in this position to be thoroughly familiar with the school system's procedures and resources. He or she could be assisted by a skilled paid aide or a volunteer who would locate and process resources, disseminate information, and do clerical work.

Another option would be for the director to combine project administration with responsibilities other than those related to the project. In that case the director would need an assistant to share all responsibilities, plus a secretary or paid aide.

In any project where an evaluation component is required, GSP experience indicates that specific project staff for this task should be hired. It is unlikely that most school systems could add evaluation of such a project to existing workloads. Optimally, the evaluation specialist should be a person who combines evaluation skills with those of media technology and content. The reason for this is that an evaluation component requires much time early and late in the project but not in midproject. After evaluation reports are devised and sent to schools, there is a period before reports are returned when there is no evaluation work. An evaluation specialist with content and media technology skills could help other staff members gather resources and prepare training materials during this time.

VII. THE MONTGOMERY COUNTY PUBLIC SCHOOL SYSTEM SUPPORT OF THE GIFTED SCIENCE PROJECT

In addition to assigning the secondary science coordinator to direct the project, MCPS supported the Gifted Science Project in other ways. These included budgeting $300 for each of 15 public tryout schools to purchase science books (GSP funds were used to purchase books for one Catholic school) and offering assistance from many divisions and departments. The MCPS system also provided the GSP with office space; office furniture; telephones; and services for photocopying, printing, and mailing.

VIII. EQUIPMENT AND SUPPLIES

A. SUPPLIES OBTAINED

The following equipment and supplies were acquired for project use:

1. IBM Selectric II typewriter with changeable elements
2. Photocopying machine and paper
3. Hand-held calculator
4. Storage and file boxes for project resource files
5. Miscellaneous secretarial, office, and filing supplies.

B. RECOMMENDATIONS

Should another school system wish to develop a similar project, the following equipment is recommended: a typewriter with a variety of type sizes and styles and a file cabinet for each staff member. Staff should also have access to photocopying equipment without having to process a formal request. A large, flexible working space with tables is necessary for the collation of large quantities of printed material. Shelving should be deep enough to accommodate large file boxes and books. A telephone is essential.

Services should also be provided for reproduction and dissemination of resource data to schools. Because microfiche readers were already available in MCPS, the GSP found reproduction on microfiche to be more cost-effective than paper copies. Microfiche also saves considerable space. This was demonstrated by work with the participating Catholic school, which did not have a microfiche reader. For the tryout in that school, the Project Resource File (PRF) was reproduced on paper. That copy of the PRF required 8 large binder notebooks for storage (8 cm x 28.5 cm), whereas the microfiche copy for the MCPS tryout schools required only 69 cards, each 14 cm x 10 cm. The GSP found contracting for microfiche production services to be far more cost-effective than purchasing microfiche production equipment. A smaller school system that compiles a smaller resource file or does not have microfiche equipment in its schools, however, may find a notebook format equally cost-effective and useful.

Equipment for producing audiovisual presentations is recommended as well; such presentations can be helpful in recruiting people and organizations as resources. Audiovisual presentations could also be produced for in-service training. Minimally, access to a tape recorder and a 35-mm camera is suggested; videotape equipment could also be used effectively. Obtaining and using audiovisual equipment should be considered early so that production can be carried on while the project is being developed. The GSP staff did not document the project's development photographically to the extent they had originally intended. The process of reconstructing events for photographing purposes and the development of an acceptable slide-tape presentation was difficult and time-consuming.

X. PROFESSIONAL READING AND RESEARCH

One of the GSP staff's first activities was to outline and conduct a program of professional reading and research. The following topics were included: characteristics of and procedures for identifying gifted and talented students, especially those gifted in science; program analysis and evaluation; types and location of science curricula and techniques and guidelines for their evaluation; and selection criteria for print materials appropriate for the gifted. The Educational Research and Information Clearinghouse (ERIC) and the MCPS Professional Library were helpful for locating information.

Once GSP staff were thoroughly oriented to the field of gifted education, they were ready to begin the activities outlined in the project proposal. A concise one-page summary of the project was composed, revised, reproduced, and used to inform MCPS staff and the public and to recruit resource persons. (A copy of this summary can be found in appendix D.)

The GSP staff also conducted several information searches to identify individuals who could provide information on science programs and/or useful science materials specifically for gifted children in Grades 3-8. Included were directors of projects being funded by the U.S. Office of Education, members of the National Science Supervisors Association, state and local directors of special programs for the gifted and talented, state supervisors of science, and state and local coordinators for the gifted and talented.

Each of these people received a copy of the project summary and was asked to help the GSP identify the following:

1. Publications or descriptions of gifted science programs for which the recipients were responsible or which they helped coordinate and implement

2. Consultants on instructional activities for gifted science students, Grades 3-8

3. Bibliographies of curriculum outlines and curricular materials being used in gifted science programs

4. Criteria for identifying and selecting instructional materials and curricula for gifted science students.

The GSP director hoped that this survey would yield specific ideas about setting up a resource bank similar to the one he envisioned, especially criteria for selecting books and published materials for young science students. On the basis of his knowledge of the field, however, he predicted that few such materials would be available. This proved to be true. Most materials received were philosophical and pedagogical rather than practical. Most information detailed criteria for selecting students and plans for programs, but few provided either criteria for selection of materials for gifted and talented students or actual sources of materials for students to use. A survey conducted today, however, might show considerably different results. (Information gathered during this survey is annotated in appendix E.)

In a further attempt to locate resources already produced, the GSP staff visited the University of Maryland Science Teaching Center, which houses 3 collections: publications selected by the National Science Teachers Association Science Materials Review Committee; curriculum documents used locally, in states, and nationally; and the Report of the International Clearinghouse of Math and Science Programs for Grades K-12. This search was useful for staff training but unfortunately it yielded limited materials that could be used by the GSP.

As the overall result of this information search the GSP staff found very little information that was concretely useful. Once satisfied that they had explored all possibilities for finding programs and materials developed elsewhere, the staff began the task of collecting its own resources.

X. THE PROJECT RESOURCE FILE

A. OVERVIEW

The primary product of the Gifted Science Project is the Project Resource File (PRF), which lists (a) community science resources (people and places) and (b) published science materials that can be used by individual gifted students in Grades 3-8. Community resources include local scientists, scientific agencies, laboratories, specialized science libraries, opportunities for science competition, and science courses. Published materials include books, kits, and media packages that provide career information, ideas for science projects, and information on developing skills in the processes used in science.

These resources are coded to the grade levels, topics, and objectives of Montgomery County Public Schools. (Appendix F contains examples of MCPS science topics and objectives.) The resources are described on individual information sheets, which have been reproduced on microfiche, a form of microfilm. As a group, the resources are referred to as the Project Resource File (PRF).

B. ESTABLISHING CATEGORIES

1. Process

Establishing categories for the PRF was a major undertaking. The staff listed all possible science resources, dividing them into initial groupings: people, facilities, and books. These were discussed with members of community organizations, staff from community colleges and universities, and employees of federal agencies. Eventually categories were refined and clarified.

The staff sought to create mutually exclusive categories with universally understood descriptions. Titles were chosen so that they clearly defined the category. This process of defining, redefining, and culling was repeated several times until satisfactory categories were determined. (A list of these categories and their definitions is located in appendix G.)

2. Recommendations

The GSP staff advises other school systems to follow a similar process for establishing categories, based on resources available in their communities, local opportunities, school system objectives, and funds.

C. METHODS OF LOCATING RESOURCE PERSONS AND ORGANIZATIONS

1. Process

The GSP staff used a wide variety of methods to locate individuals and organizations willing to serve as resources for the project:

1. Numerous directories, books, and pamphlets that described community resources were consulted. Those that provided resources related to scientific concerns or efforts were identified. (An annotated bibliography of these sources can be found in appendix H.)

2. The local community college proved to be an extremely valuable resource because of its commitment to serve the public.

3. Additional colleges and universities in the area also proved to be valuable.

4. The GSP staff identified specific occupations related to science and engineering (including, among others, medical doctors and researchers, veterinarians, chemists, physicists, and the like) and then located people who held jobs in these fields.

5. Professional associations and organizations of scientists and engineers gave the GSP staff helpful leads in locating people willing to serve as resources.

6. Retired citizens' groups were contacted in order to find resource people, but results were limited.

7. Institutions and government agencies at the federal, state, and local levels often yielded resources.

8. Local groups concerned with the environment and conservation were useful. The Audubon Naturalist Society, for example, provided the GSP with numerous resources.

2. Recommendations

On the basis of their recruitment experience the GSP staff recommends that other school systems pursue resources in a similar fashion. By considering whether the local economy is primarily agricultural or industrial, a school system can begin the process of locating many resources for a project of this type in any community. The following list is not in any way

exhaustive, but is intended to illustrate the wealth of potential resources in any community:

1. Virtually every community has government agencies that should prove useful. Local offices of federal and state governments, agricultural extension agents, and other governmental groups can be contacted in an effort to locate resources.

2. Corporations, factories, and industries should prove useful as well. By analyzing the nature of local industry, staff should be able to identify occupational groups within it. Public relations and personnel officials may be willing to identify specific people who have knowledge and skills in scientific disciplines. Local chambers of commerce may assist staff in identifying area industries that might prove helpful.

3. State or local academies of science may have membership lists that will yield potential resource persons.

4. Public libraries typically have copies of various local directories of community service and fraternal organizations.

5. Local groups concerned with environmental issues--birdwatchers, for example--include many people who have expertise in some scientific field. Local zoos, national or state officials, naturalists, and state departments of natural resources may also have staff willing to serve a project.

6. Local groups with health concerns--cancer, lung, and heart associations, for example--may also have staff with scientific expertise.

7. In areas with bodies of water, research stations are generally nearby; these provide numerous opportunities for the enrichment of science studies.

8. Weather stations and local television meteorologists could also prove helpful.

9. Various organizations, educational institutions, corporations, etc. have speakers' bureaus. Some provide a list of speakers while others provide speakers on various topics by request. In either case, people with scientific expertise may be identified. If these individuals are not able to help, they may provide leads to others who can. (Appendix I lists some speakers' bureaus in the Washington area.)

10. Local 4-H agents, nature centers, and leaders of Boy and Girl Scout troops may provide valuable help.

11. Museums usually have staff with scientific expertise.

12. U.S. military installations and National Guard units may also be useful. The base's public information officer may be helpful in identifying potential science resource persons.

13. Airports may be able to provide similar identification services.

14. Retired teachers' associations may also be able to identify potential resource persons.

15. Secondary school and college teachers are frequently willing to assist younger students.

16. Science fair judges and groups that offer awards at these fairs may prove helpful in many ways.

17. State departments of education may also be able to identify places where resources may be located.

18. The Resource Directory of Handicapped Scientists, published by the American Association for the Advancement of Science, and The Women Scientists Roster, published by the National Science Teachers Association, list scientists by geographical area. Comparable directories, lists, or rosters may be available from other professional associations.

19. Games for the Science Classroom, published by the National Science Teachers Association, has annotated references to games for various subject areas and grade levels. Several of the games could be useful for project ideas.

D. INFORMATION SHEET

Following a number of revisions, a standard letter was developed for communicating information about the project to potential community resources. (This letter is shown in appendix J.)

E. RECRUITING

1. Process

Once potential resource persons were located, the GSP staff developed an initial set of recruiting procedures. The staff found that an enthusiastic, positive approach facilitated the volunteering of resource persons. Potential resource persons were assured that they would be in full control over the extent of their participation and the time they would spend with any student. They were further assured that if at certain times of the year they became overcommited and did not have time to participate, they could change their involvement accordingly.

The most productive approach for obtaining a mentor was to ask the person to agree only to meet with and interview a gifted science student, and then determine whether he/she could provide additional information or further assistance. Most persons seemed to prefer this rather than specify a specific activity or project in advance. In this way, participation remained under each resource person's control.

Once convinced of the project's value, organizations and individuals assisted in this recruitment process. Often the first person contacted in an organization acted as a coordinator, recruiting others. Others suggested colleagues who they felt might be interested. In most cases the GSP staff asked resource persons to suggest additional contacts.

Several organizations requested that the GSP staff give a group a presentation to explain the project, and this frequently yielded resources. Other organizations requested that the GSP staff provide information for a poster or a news release for inclusion in newsletters. In addition, GSP staff sent information about the project to several agencies, universities, and corporations for department meeting discussions. Lists of organizations that requested and received news releases, poster information, and presentations can be found in appendix K.

2. Recommendations

On the basis of their experience in developing the recruitment procedures the GSP staff suggests that other school systems may wish to adopt a similar set of procedures and correspondence/report formats.

The GSP experience also indicates that there are distinct advantages to the coordination of community resources by a central office staff:

a. It assures greater diversity of all types of resources.

b. It also assures that no community resource or individual will receive uncoordinated requests to be part of the resource files of numerous different schools.

c. It allows the project administrator to keep track of the amount of use each community resource is getting and thus help avoid overload and subsequent loss of resources from the project.

Central coordination, it should be noted, does not necessarily mean that a resource person will be listed as a resource for all gifted in the school system. In a large system--e.g., one of 100 buildings, 60,000 children, or more--resource persons may wish to limit themselves to helping schools in a certain geographical area or to working with a limited number of grades.

In addition to central office coordination, local schools, area offices, and individual parent-teacher or parent-teacher-student associations might be interested in expanding the resource file to include local resources.

F. AFFIRMATIVE ACTION STEPS

In keeping with the MCPS commitment to provide equally excellent educational experiences for all students, regardless of race, sex, or handicap, the GSP made special efforts to insure that students would be provided appropriate role models. An analysis of the initial pool of resource people revealed a shortage of both female and minority scientists. Therefore, the GSP staff embarked on a program to recruit additional resource persons in these categories. Professional organizations of minority and female scientists were contacted by telephone and letter. (A copy of the letter can be found in appendix L.)

The GSP encountered some difficulties in this recruitment effort, finding that many minority and female scientists already had significant responsibilities in the community. Nevertheless, the proportions of persons in these categories serving as resources to the GSP were significantly increased. Specific data on their participation can be found in the Evaluation Report on the Gifted Science Project. Of the 126 resource persons in the final edition of the PRF, there are 37 (29%) females, 14 (11%) blacks, and 4 (3%) other minorities.

In searching for and selecting resources for handicapped students, the GSP staff began by determining whether the physical facilities where resources were located presented problems of access. Since the GSP found that every resource initially contacted had provided access for the handicapped, staff members eventually dropped this question from their telephone calls and letters. Nevertheless, school systems devising a similar project are advised to insure that the needs of handicapped students are met and that any resources with limited access are clearly identified in resource materials.

Resources listed in the PRF that could pose problems for a handicapped student include a statement to that effect. For example, a forest management activity requires rigorous hiking. In another case, climbing a ladder to reach a roof-mounted telescope is required.

The Resources Directory of Handicapped Scientists and Women Scientists Roster, not available when the GSP resource file was developed, should prove useful for recruiting handicapped and female scientists.

Published materials were also evaluated in terms of role models presented. Books that included illustrations of minority and female scientists were given priority. Numerous publications were identified with career information and role models specifically for female and black students.

G. METHODS OF LOCATING PUBLISHED RESOURCES

1. Process

The GSP search for published resources was expedited by the fact that the project director has 20 years of experience in evaluating science books. As well as reviewing science education materials for 5 professional journals, the GSP director is the director of the area science fair and has for years had a strong interest in identifying materials that provide projects for science students. In addition, he had already prepared a number of bibliographies annotating materials of this nature. Another system wishing to develop a similar project is advised to search for a staff member or consultant with comparable experience.

Additional sources the GSP staff consulted include the following:

1. Science Service Incorporated--This group publishes science fair materials.

2. American Dental Association, local utilities, environmental agencies, oil companies, General Electric, and the Edison Electric Institute--All these agencies provided materials for student projects.

3. A two-volume collection on science books produced by the American Association for the Advancement of Science--This collection is periodically updated, and regular revisions are noted in the professional journals listed in 4.

4. Book reviews--The most helpful reviews were found in the following journals: The American Biology Teacher, published by the National Association of Biology Teachers; Science and Children (elementary) and The Science Teacher (secondary), published by the National Science Teachers Association; AAAS Science Books and Films, published quarterly by the American Association for the Advancement of Science with reviews of science books for people of all ages; and Appraisal, a quarterly book review published at Boston University by the Children's Science Book Review Committee.

5. Commercial advertisements and catalogues--These sometimes led the GSP staff to helpful materials.

6. Bibliographies included in already existing curriculum documents and programs of study.

7. "The Amateur Scientist"--This monthly column in Scientific American magazine explores science concepts by describing experiments and projects that illustrate each concept. A 30-year index of the magazine (1948-1978) was useful in identifying appropriate project ideas.

The PRF also provides information on careers related to science and engineering. The following sources were helpful in locating materials of this nature:

1. Educational materials publishers are increasingly making available career materials.

2. Professional organizations and societies provide a wealth of free materials on careers. These organizations are listed in the Encyclopedia of Associations (Detroit: Gale Research Co.), a standard reference work updated annually and located in most public libraries.

3. People in science and engineering occupations themselves are among the most useful sources of career information. A number of people who serve as mentors to the GSP also provide information about their careers.

4. The March and April 1978 issues of The American Biology Teacher were wholly devoted to science careers.

5. The April 1976 issue of School Science and Mathematics published an article titled "New Resources on Career Information Materials," which gave the GSP several useful leads.

2. Recommendations

In addition to exploiting the resources described in the previous section, others are advised to try several additional methods to locate published resources:

1. Science departments of state offices of education should be helpful in providing leads.

2. Specialists in science who might be willing to act as consultants may be located in colleges and universities. Public school system science supervisors or coordinators may also have expertise of this nature.

3. The University of Maryland has two collections that could prove helpful: (a) all materials reviewed in National Science Teacher's Association review journals are processed by the NSTA Science Materials Review Committee. Most of these materials are housed in this collection. (Other universities may have similar collections.) (b) In addition, the International Clearinghouse of Science and Mathematics, also housed at the University of Maryland, has a catalogue of science and mathematics programs.

4. Though the Educational Research and Information Clearinghouse (ERIC) did not prove very useful to the GSP in 1977, subsequent additions to this data bank may make it worthwhile to others.

H. SELECTING PUBLISHED RESOURCES

Because the number of books that address science content (such as texts, encyclopedias, and typical library science collections) is so large, and because these books are generally readily available to students, the GSP staff chose not to include materials of this nature in the PRF. Instead, the PRF focuses on materials that:

1. Present information about careers in science.

2. Give ideas for student projects and activities.

3. Describe science processes and skills used in projects.

Hence, the emphasis is on activity- and career-oriented materials that permit gifted students to conduct investigations and pursue activities independently. Only print and nonprint materials that met these criteria were selected for the PRF. Films were not included because of their expense; their content, which is not generally project- or activity-oriented; and the difficulty of using them with individual students. It was hoped that materials selected for the PRF would act as catalysts for student creativity and prompt students to explore science careers, become involved with science projects, and develop science process skills.

The GSP staff identified suitable books by studying the director's large personal collection, reviewing new books and media materials being considered for purchase within the MCPS system, and reading annotations in professional journals. They then selected those that seemed suitable and purchased them from grant funds. Great care was taken to identify materials that were nonsexist (both in role models and in the sexes of children shown doing experiments) and contained information on minority and handicapped scientists.

Next the GSP staff categorized the materials, following the same procedures they had used to categorize resource persons and organizations: examining published materials, making tentative classifications, creating operational definitions, and revising these definitions. The three final categories were Career Information, Project Ideas, and Science Processes. (Published materials resource categories are defined in appendix G.) Additionally, the published materials were coded according to the topics, grade levels, and objectives of the MCPS Science Instructional System.

During the time they were waiting to receive books, the staff developed a standardized sheet for annotation (see example in appendix M). These annotations were later compiled into separate bibliographies.

I. DETERMINING APPROPRIATE GRADE LEVEL CLASSIFICATIONS FOR PUBLISHED RESOURCES

Determining appropriate grade level classifications for published resources for gifted students in Grades 3–8 proved to be a very difficult task. No guidelines were found during the extensive literature search conducted early in the project, which meant that the GSP staff had to make their own judgments about the appropriateness of materials. All materials were expected to challenge students to think on higher cognitive levels--analysis, synthesis, and evaluation. The materials also had to relate to the MCPS instructional objectives and GSP resource categories.

Using standard readability formulas was not helpful, since these give only reading level and do not account for the complexity of concepts. Balancing these two factors created great difficulty, since much material either (a) appeared too easy to read yet actually presented complex concepts or (b) was difficult to read but presented simpler projects or activities appropriate for younger gifted students. The GSP staff thus assigned grade level classifications subjectively. Their judgments were based on content and on these general criteria:

1. The relationship of the materials to the MCPS Science Instructional System

2. The complexity of content presented in the materials (i.e., higher cognitive levels)

3. The appearance of the materials

4. The apparent readability of the materials.

As a result of engaging in this process, the GSP staff sees a need for the development of an objective procedure for evaluating materials for gifted students. Such a task was not within the scope of the GSP staff, given its additional goals and responsibilities.

J. SAFETY CONCERNS

A primary concern of the GSP was the safety of some activities suggested in the PRF. Science materials intended for the average 8- to 14-year-old student should generally avoid any activities that may involve dangerous equipment or chemicals. Yet some of the materials chosen for gifted science students were originally intended for older students who have more experience, generally use better judgment, and are trained in safety-related concerns.

In compiling the PRF the GSP staff encountered numerous activities and experiments involving potentially hazardous electrical equipment, heat, open flames, caustic or flammable chemicals, moving machines, or tools (e.g., soldering irons, glass cutters, and saws). The staff then

had to exercise judgment to determine whether the activity should be rejected, or whether it could be included with a caveat that a particular activity or experiment required supervision by a qualified adult.

A similar concern existed with respect to visits with mentors in potentially dangerous facilities. In negotiating these arrangements, the GSP staff took steps to insure that students would not be exposed to carcinogens, radiation, and pathogenic bacteria, etc.

Several publications provide guidelines on hazardous situations and substances to which students must not be exposed. Some examples are as follows:

Fire Protection Guide on Hazardous Materials. National Fire Protection Association. New York: Van Nostrand Reinhold, 1972.

Guide for Safety in the Chemical Laboratory. Manufacturing Chemists Association. New York: Van Nostrand Reinhold, 1972.

Handbook of Laboratory Safety. Ed. Norman Steere. Cleveland, OH: Chemical Rubber Company, 1967.

Safety in Academic Chemistry Laboratories. American Chemical Society. Washington, DC: the Society, 1979.

Safety in the Secondary Science Classroom. National Science Teachers Association. Washington, DC: the Association, 1978.

XI. INITIAL STATE ON-SITE EVALUATION

During February of the first year the first of two on-site visits to the project by a Maryland State Department of Education Title IV-C On-site Evaluation Committee took place. These evaluations are required under state and federal funding provisions; the committee measured the progress of the project in terms of its developmental objectives.

The On-site Committee commended the GSP staff for the following:

1. Taking an organized approach in an area usually neglected
2. Carefully selecting materials and media for gifted and talented students rather thar watering down higher level materials
3. Gathering information about human and institutional resources, particularly mentors
4. Creating a practical evaluation strategy.

The On-site Committee recommended the following:

1. That the GSP pay particular attention to the needs of gifted and talented students from diversified backgrounds and avoid sex-role stereotyping

2. That dissemination activities within the school community be increased (since users may not be ready for a product if a large amount of preliminary information is not given)

3. That the GSP staff be involved in developing a formula for identifying the gifted and talented.

In following up on the recommendations, the GSP assured the State Department of Education that published materials with sex-role stereotyping are avoided in the PRF; that affirmative action steps had been taken to obtain women and minority resources; that many community information/dissemination activities were being conducted and more were being planned; and that the staff had reviewed the MCPS gifted and talented guidelines.

XII. EVALUATION

A. PROCESS

The main purpose for developing evaluation instruments was to show if the GSP met its objectives (see appendix N). Initially, 14 reports were designed by the staff and the consultant.

Although the staff searched for reports to serve as models, no acceptable formats were identified. Consequently the staff undertook the task of designing original reports that fulfilled the requirements of the developmental and evaluative objectives. All questions were written to provide reliable feedback and not merely socially acceptable responses. Questions were positioned on the page in such a way that the user could easily complete them and the evaluator could easily compute the data. Each report included a statement about its purpose, who was to fill it out, and where the report was to be sent.

In working with the 14 reports the staff decided that the evaluation would be difficult to administer and that there probably would be great user resistance to the large number of required reports. Therefore, during the second year they consolidated the evaluation reports into 8, which were refined for the tryout.

During June 1978 the evaluation specialist wrote an evaluation protocol. This included and described all data collection reports and explained how and by whom they were to be completed. This protocol was used during

GSP staff discussions and for meetings with the project consultant. All reports are included and described in the Evaluation Report on the Gifted Science Project.

The evaluation specialist who began the study left the project in August 1979. His replacement was oriented to all aspects of the project so that evaluation tasks could be continued. These tasks included issuing and collecting the evaluation reports, analyzing data, interpreting results, and preparing the Evaluation Report on the Gifted Science Project.

B. RECOMMENDATIONS

The GSP staff strongly recommends that a similar project with an evaluation component be designed around only two or three main objectives. There was great resistance on the part of both teachers and resource persons to filling out the numerous evaluation reports that resulted from the large number of GSP objectives. Explaining these reports caused considerable confusion during in-service sessions, and it necessitated numerous repeat training sessions. Eventually the GSP staff assumed much of the teacher's responsibility for completing reports.

XIII. INCLUSION OF RESOURCES IN THE PROJECT RESOURCE FILE

As described earlier, resources chosen for inclusion in the PRF were coded to grade level, topic, category, and SIS objectives. When production of the PRF was imminent, an analysis was done to determine if there were any gaps in resources available for each of these. This analysis revealed a number of deficiencies (e.g., only one library was listed, and there were no mentors for some topics).

Searches for additional resources were directed toward enrolling three to nine resources for each objective. This task was aided by the fact that one resource person frequently could provide support for more than one objective.

Enrolling each resource required a substantial amount of staff time. All staff members shared this task. As the various staff members contacted potential resources, it soon became apparent that there was a need for a uniform procedure to assure similar results. A series of highly effective procedures, reports, and letters evolved. (Copies appear in appendix O.)

The difficulties encountered when seeking participation of resource persons included lost or misplaced correspondence, problems in reaching some persons by telephone, and changes in work locations and/or telephone numbers. In order to insure an accurate description of each resource

person's participation, each information sheet was written, edited, typed, and submitted to the person for approval. Resource persons were asked to initial the description if it was correct or make necessary changes and return the initialed or corrected copy. (A sample PRF sheet describing a community resource appears in Appendix P.)

XIV. PREPARATION OF THE PROJECT RESOURCE FILE FOR MICROFICHE

During fall 1978 final decisions were made about the format of the PRF sheets. The sheets were then typed, and proofread to make certain that they were free from typing error and included correct designations of grade, topic, objective, and resource category.

Preparing this file for microfiche reproduction involved the entire staff in detailed clerical work in March 1979. This process was both complicated and tedious. All sheets needed to be retyped, using large, sans-serif type, which could be seen easily after reduction to microfiche. Since separate sheets were used for each of the four designations (grade level, topic, category, and objective), a master copy for each resource was typed first. It was then proofread by three staff members. Next the appropriate number of copies were made, and the correct designation was noted in pencil on the back of each. Finally, the designations were typed on the photocopies. Following this, each sheet was numbered on the back, and the numbers were entered on a dummy microfiche layout grid. The sheets were then sent to a company that produced microfiche. This edition of the PRF included 1,774 separate sheets.

XV. SELECTING TRYOUT SCHOOLS

Sixteen schools participated in the development of the GSP. Fifteen were Montgomery County public schools, and one was a local Catholic school. Two elementary and one junior high school were chosen by each MCPS area administrative office during winter 1978, using the criteria that schools would:

1. Remain open through the 1979-80 school year.
2. Participate in the Science Instructional System.
3. Include as many of the project grade levels as possible (e.g., 1-6; 3-6).
4. Have a full-time media specialist in the building.

All the county schools chosen to participate in the project met the first criterion. All but two of the schools met the second criterion; these two were selected because they had already implemented special science and gifted programs. Though these two schools were not part of the SIS tryout, they were provided with the SIS materials and given an SIS orientation session.

The one Catholic school that participated in the project had Grades 3-8 and was chosen through negotiations with the Archdiocese of Washington after letters of invitation to join the project had been sent to Montgomery County independent and Catholic school organizations.

XVI. PREPARATION FOR THE PILOT

A. PRODUCTION OF IN-SERVICE MANUALS FOR IN-SERVICE TRAINING

Before a pretryout pilot of the GSP was possible, the staff had to complete development of the PRF and design an in-service training program. Their first task was producing the In-service Manual. This manual described (a) the purposes of the GSP, (b) the nature of the resources provided, (c) how to use the resources, and (d) how to complete the evaluation reports. The GSP staff endeavored to make the manual practical, useful, and clear by creating a special format: each separate item is explained on the left-hand page with corresponding explanatory notes on the right-hand page. The MCPS graphics and printing staff provided helpful advice and assistance during this preparation.

The first edition of the In-service Manual was used in February through June 1979 during the pilot. Revisions based upon the GSP staff's experience during the pilot are reflected in the second edition, published in September 1979. It is available as a companion document to this report.

B. IN-SERVICE TRAINING

In February 1979 a one-day countywide in-service training session was held for the principal, the media specialist, and at least one teacher from each tryout school. At this meeting the first edition of the PRF was described and the In-service Manual was distributed; these materials remained in the schools until June of that year.

During the in-service meeting the staff described the GSP and its development, suggested identification procedures for participating students, and described the evaluation component and related reports. Role-playing exercises were conducted to simulate the use of the PRF for a hypothetical fifth grade student. At the conclusion of the session the staff offered to assist all participants in actual use of the PRF in their schools during the pilot.

Several schools responded, and the staff provided additional training, using the In-service Manual as the basic information document. A question-and-answer period ended each session. The sessions were held after school, and were limited to 45 minutes. In this short amount of time it was difficult to include information about both the PRF and the evaluation reports.

Some principals required their entire faculties to attend these individual in-service sessions (e.g., physical education, music, and K-2 teachers). The understandable lack of interest in the project from noninvolved school staff members made effective presentation difficult. The GSP staff subsequently requested that principals include only teachers in Grades 3-8 who had teaching assignments related to science or gifted education.

In general, use of the PRF was limited during the pilot. However, helpful comments from teachers who did use the file, combined with the experiences of the project staff, enabled the staff to make a number of revisions to both the PRF and the In-service Manual. These materials formed the basis of the formal tryout, which took place from October 1, 1979 to January 31, 1980.

C. RECOMMENDATIONS

A new project should be introduced at the beginning of the school year. The pilot of the GSP received very limited use in part because it started in the spring, which traditionally is the busiest time of the school year. In addition, only school staff directly involved with the project and others interested in it should attend in-service training sessions.

XVII. SECOND STATE ON-SITE EVALUATION

The second progress evaluation of the GSP by the Maryland State Department of Education took place in March 1979. This day-long meeting was attended by several MCPS executive staff and by the GSP staff.

Commendations were given by the State Department of Education for the following:

1. Leadership quality in developing/implementing the project
2. Increased identification of resources for the gifted and for obtaining resource persons' assistance
3. The exemplary procedures and methods used in the project, which the State Department of Education said could well be used by other local agencies or schools.

Recommendations were as follows:

1. That more in-service sessions be given to familiarize users with the system and thus increase use

2. That data be collected during the tryout on the quality of activities provided by the resources

3. That alternate plans for dissemination be considered so that more MCPS schools could use the GSP before the end of the grant

4. That information on the GSP be disseminated throughout all Montgomery County schools and communities during the tryout in order to get community support.

In following up on Recommendations 1 and 2, the GSP staff assured the State Department of Education that additional in-service sessions were already under way and that evaluation data were being collected on the quality of activities provided by the resources. In replying to Recommendation 3 the staff explained that they did not choose to disseminate information to other MCPS schools at this time, since the grant was specifically for development. They explained that dissemination plans were under way and would be carried out as soon as development ended. In replying to Recommendation 4, the staff explained that limited public relations efforts had been undertaken early in the project. Local associations for gifted and talented education were kept up to date on the project's progress; announcements about the grant were printed in the local press; talks were given at local universities; and the project director gave a presentation in Anaheim, California, at the National Science Teachers Association Regional Conference. This early public information created problems when citizens and MCPS staff from nontryout schools made incessant demands upon project staff to obtain material before it was developed.

XVIII. THE PROJECT RESOURCE FILE: EXPERIENCE WITH USERS

MCPS staff who used the PRF during the pilot felt that having a separate information sheet for each MCPS objective was too cumbersome. Therefore, during summer 1979 the GSP staff revised the PRF, which was again produced on microfiche. In this second edition all MCPS objectives for the same resource were combined on a single sheet, although separate sheets for each grade, topic, and resource category were still produced. As before, revision included carefully updating all community resource information, adding additional community resources and published materials, retyping, proofreading, and laying out the microfiche grid.

Combining objectives on one sheet substantially reduced the total number of pages in the PRF file. Thus, even though the number of resources in the PRF increased from 85 in the first edition to 350 in the second edition, the total number of pages increased only from 1,774 to 2,961. This is an increase of 312 percent in resources and an increase of only 67 percent in the total number of pages.

XVIX. THE TRYOUT: OCTOBER 1979 THROUGH JANUARY 1980

In order to encourage participation in the GSP, the staff began the tryout by making specific their desire to assist tryout schools. They did this by sending each school a list of tasks the GSP staff would do (see appendix Q). This offer was followed by staff calls to each school, resulting in staff visits to 14 of the 15 public schools and to the Catholic school.

The GSP staff spent the fall interviewing students, completing initial evaluation reports, and making arrangements between resource persons and parents. With this help, use of the project increased considerably: 103 students actually used resources of people or books, and two teachers followed up by finding additional resources for students originally helped by the GSP staff. A complete analysis of the data collected is available in the Evaluation Report on the Gifted Science Project.

XX. RECOMMENDATIONS FOR IN-SERVICE TRAINING

The GSP staff learned that individual school in-service training sessions are more effective than large, multi-school sessions. In addition, role-playing is an effective method of presenting a project such as the GSP. If possible, actually helping a student in the school would benefit both the student and a teacher and would demonstrate the project and encourage its use.

If microfiche is used to store resources, a microfiche reader should be part of the in-service session. Each potential user should be encouraged to use the microfiche reader so that any questions can be answered during the training sessions.

XXI. PUBLISHED MATERIALS FOR TRYOUT SCHOOLS

A. ORDERING

1. Process

During the tryout, annotated bibliographies of published materials listed in the PRF were sent to each tryout school with the announcement that $300 was available to purchase published materials for gifted students. The schools were directed to make first and second choices from the GSP list that seemed most useful to their students. Although data were not collected, it seems, from the readiness of schools to request these materials, that many of the items were not in school collections.

For the GSP staff, ordering and processing published materials for the tryout schools was a major task. An entire room was devoted to receiving, sorting, and boxing requested items. Several books listed in catalogues as being available or listed in the latest edition of Books in Print were found to be out of print, even though a copy had recently been obtained for review. Each time this happened, the staff and to call or write the publisher to determine the future availability of the book. If it was to be unavailable, the staff had to review all schools' request lists and make another choice. These second choices then had to be ordered and processed. In addition, publishers were slow to fill orders, which meant that not all books ordered by any one school were received at one time. Because there was not enough room in the office to keep partial orders for long periods, the GSP staff had to make several deliveries to each tryout school. The entire ordering/delivering process took more than 5 months. In addition to purchased materials, numerous free materials, mostly career information booklets, were obtained for all tryout schools and delivered with other ordered items.

2. Recommendations

If a project includes references to books and media, it is essential that money be provided for their purchase. Ideally, each school should have its own collection. If that is not possible, a central collection with multiple copies of each item should be available for loan.

The GSP staff spent long hours processing school orders. Another project would be wise to consider hiring students after school hours or aides to do this job.

B. DELIVERY TO TRYOUT SCHOOLS

A number of service and clerical tasks were undertaken by the GSP staff in order to provide schools with materials for both the pilot and the tryout. Evaluation reports, in-service manuals, and the PRF file on micro-

fiche had to be delivered and picked up for each period. Later, copies of the bibliographies were delivered; and still later, the published materials ordered from the bibliographies were delivered. These personal deliveries increased the visibility of project staff in the schools; in the director's opinion, this may have increased teachers' use of the GSP staff to implement the project.

XXII. IDENTIFICATION OF THE GIFTED AND TALENTED

A. PROCESS

Each tryout school was asked to identify its gifted students who were particularly motivated in science. County guidelines for selecting gifted students in Grades 1-5 were available, however they were not mandatory, and the GSP staff soon realized that each school selected students differently. In some cases truly gifted students were selected; in other cases the students selected were bright, but not necessarily gifted. Prior to completion of the project, county guidelines for selecting gifted and talented students in all grade levels were distributed. Schools are now applying these guidelines.

B. RECOMMENDATIONS

Before implementing a similar project a school system should make certain that systemwide selection criteria are used by all schools. These are essential to insure that a student who participates is one who will most benefit from the enrichment afforded by such a project. Furthermore, a student should be carefully screened to insure that he/she is specifically motivated in science. A project such as the GSP is intended to expand and reinforce knowledge of subjects a student is already motivated to study, not to provide basic information or create motivation.

XXIII. PROJECT RESOURCE FILE: FURTHER EXPERIENCE WITH USERS

Throughout the project the GSP staff continued to revise the PRF to make it more usable. Feedback indicated that there were two separate problems that limited use of the PRF:

1. Despite reducing the number of PRF sheets from the pilot to tryout editions, users still felt that there was unnecessary repetition of information sheets throughout the PRF.

2. Using the microfiche reader in the school's media center for all reference work was inconvenient and time-consuming for teachers.

Users asked for a more compact file and for a print copy of the PRF. The GSP staff was reluctant to make available a printed copy of the full resource file because (a) resource persons had been assured that their telephone numbers would be kept within the school system until they had determined their interest in working with a specific student and (b) the size of the file in paper copy (8 large 3-ring binders) would be extremely expensive to reproduce as well as cumbersome to use. However, because use of the PRF had been so limited, the staff realized that some compromises would be necessary to encourage its use.

Teachers made a number of suggestions for improving the organization of the PRF and these, along with the experience of the GSP staff, provided the framework for the reorganization used in producing the final edition of the PRF. This edition consists of two parts: (a) indexes and (b) information sheets which are grouped separately for Community Resources and Published Materials. The indexes (see appendix R for example) are organized by grade and topic and are lists, by category, of every resource available for that grade and topic. The PRF sheets contain a description of each resource and are grouped by category. These PRF information sheets are essentially the same as those in the previous editions except all grades and topics for which the resource is appropriate are listed on the sheet. This, in effect, reduces the duplication of these sheets in the PRF. A user now will refer to the index for the student's grade and topic of interest, note potential resources and refer to the information sheets (Community Resources and/or Published Materials) for a detailed description. This method of organization reduced the number of pages in the PRF from 2,961 in the second edition to 475 in the final, although resources were increased from 350 to 432.

In addition to having the indexes available on microfiche, teachers will receive a printed copy of the indexes for their grade(s). They will also have access to a print copy of the Published Materials in the form of bibliographies. These bibliographies, separate for Career Information, Project Ideas, and Science Processes, are reproductions of the PRF information sheets. Information sheets on Community Resources are available only on microfiche, however. Print copies are not being produced in order to limit the chances of compromising telephone numbers and addresses of resource persons.The GSP staff hopes that since teachers will have their own index their use of the PRF will be encouraged and facilitated. With the index they can more easily identify resources for a student. They can then use the microfiche file to determine details, such as mentors' telephone numbers, handicapped student restrictions, and book details.

XXIV. MICROFICHE

A. USER EXPERIENCE

Users of the PRF felt limited by being forced to use the microfiche readers to determine all resources available for a student. Microfiche readers are located in the schools' media centers and are too bulky to move easily to a classroom. Thus, though microfiche has the clear advantage of being able to store large quantities of data in a small space, it also has the clear disadvantage of being able to retrieve those data only in limited locations.

For MCPS users this problem was exacerbated by the fact that after microfiche production the GSP staff learned that all microfiche readers in the tryout schools were equipped with a lens that did not correspond to the reduction ratio used. This meant that the image of each sheet was too large for the reader's screen, and thus the reader had to move each sheet around in order to see all the necessary information. This problem substantially increased the time necessary to obtain references. This problem was corrected by changing the reduction ratio from 28:1 to 42:1 in the final PRF, and the GSP staff believes that future users will have a more successful experience.

B. PRODUCTION RECOMMENDATIONS

Each microfiche reproduction company has its own specific instructions for the layout of pages for fiche, and any system devising a similar product should work out details with their microfiche contractor. The most important consideration is that the fiche be produced to fit the equipment available; otherwise, the projected image will either be too big and will not fit on the screen, or will be too small, and will be difficult to read. GSP staff found it helpful to take a sample reader to the microfiche company when they planned layout and reduction options.

XXV. THE FINAL STAGE OF THE GIFTED SCIENCE PROJECT

In October 1979 a mini-evaluation team from the Maryland State Department of Education visited the project. This visit was to review the status of the project and to discuss the possibility of a continuation grant, with reduced Title IV-C funding and increased MCPS commitment, to provide in-service to additional county schools during 1980-81 after the development project was completed. The visiting team reported favorably and extended an invitation to submit a proposal; one was subsequently prepared.

In January 1980 the GSP media specialist left the project. The reduction in staff size required that the remaining two staff members take on his duties as well as doing their own. Both continued to work with tryout schools beyond the official end of the tryout in January. This was necessary to help complete work with children that the staff had begun earlier in the project.

The evaluation specialist spent a number of months developing a system for obtaining evaluation data and analyzing the data. A letter was sent to teachers and resource persons requesting that they complete an evaluation report (or have the student complete one, whichever case applied). Another letter requesting the same information was sent if the teacher or resource person had not returned the report within 4 weeks. In addition, a system was devised to keep track of letters that had been sent, replies received, and follow-up letters that needed to be sent. Evaluation of the GSP continued into the spring and culminated with production of the Evaluation Report on the Gifted Science Project.

An evaluation report and a final report of the GSP were needed to fulfill the terms of the grant. The GSP director wanted to go beyond this minimum requirement for reporting on the project, however, and produce additional documents for other school systems that might wish to develop a similar project for other grades or subject areas. He envisioned producing a dissemination package that would include (a) a complete history with detailed information useful for setting up a similar project, (b) a user manual for the PRF, and (c) an annotated bibliography of all materials submitted as the result of the national information search.

It was clear to the director that the two GSP staff members could not produce all these materials in the time remaining before the project ended. Therefore, a production and editing team was hired for the last 10 weeks of the project.

XXVI. THE FUTURE OF THE GIFTED SCIENCE PROJECT

In June 1980 a grant was given by the Maryland State Department of Education to implement the GSP in 27 additional public and private schools, to modify procedures and products from the development project for use during implementation, to design an in-service program for area office staff, and to develop plans to incorporate the GSP into the MCPS Program of Studies. Dr. Charles J. LaRue, elementary science coordinator for MCPS, will supervise this implementation project.

It is hoped that relationships developed between mentors and students will continue beyond their specific involvement in the GSP tryout. To help teachers in fall 1980 to be aware of the experiences that students have had

with the project, the GSP director sent a memorandum with a project summary to all tryout school principals encouraging them to include a copy of it in the student records, which will be transferred to the new teachers for next fall. (This memorandum is shown in appendix S.) For students who were in Grade 8 this year, further opportunities will be available next fall. Appendix T lists various courses, programs, and projects available to them.

Since the GSP's inception, it has been planned that MCPS will incorporate its revision of the PRF into ongoing staff activities. The GSP director will keep a file of (a) changes in community resource telephone numbers and addresses and (b) new published materials to be added. Every two years two part-time staff and clerical support will be requested during the summer to update the PRF.

XXVII. FINAL RECOMMENDATIONS

It is critical to consider initial staffing carefully. The ability of all staff persons to interchange roles is essential. A base staff plus part-time help would be ideal, since the nature of a development project such as the GSP dictates that there are times of intense production and times when only one or two staff members are necessary.

Because most resource persons can be contacted only during working hours, teachers generally found it very difficult to make arrangements for students to use resources. Therefore, the GSP recommends that schools using the PRF to help large numbers of students try to obtain aides or parent volunteers to support teachers in this effort. Such persons should be careful to introduce themselves as volunteers for the school system so that resource persons will know that their names and telephone numbers are not being generally distributed.

If a history is required, semi-annual reports should be written throughout the project. Trying to reconstruct details at the end is difficult and is usually made even more so by the fact that most long-term projects experience some staff turnover.

Adopted by the Board of Education — February 12, 1973

The Goals of Education

The goals of education for the Montgomery County Public Schools are set forth in this statement of public policy to guide the school system in developing, implementing, and improving educational programs for its students. This statement outlines those goals considered by the citizens of the county as most important for the education of their children in public schools and for which the citizens will hold the school system responsible and accountable.

The school system has the primary responsibility for some of these goals. For others, it shares that responsibility with the home and other community institutions.

The extent to which these goals can be realized will depend upon the endorsement by and continuing commitment of the school system staff, students, parents, and the community. With broad endorsement and wide support, the Montgomery County Public Schools will continue its development to serve its students and community in the most effective way possible.

Education is a process that encompasses the total experiences of each individual throughout a lifetime of formal and informal learning. The school program, as a keystone in this process, should provide opportunities and encouragement for students to acquire knowledge, to explore ideas, to ask questions, and to seek answers that will lead to sound and useful conclusions.

The probability of success motivates students to learn. Each school must create a program and maintain a climate in which every student has opportunities for success. Each individual is unique, and the school shall encourage that uniqueness. The school should help students understand their own values and the values of others.

The school program, while developing the skills of learning, should be based on the study of broad human concerns, flexible enough to deal with changing concerns and at the same time related to the needs, interests, and concerns of each student. The program should offer opportunities for decision-making. It should help the student develop a capacity to learn that will be retained for a lifetime, to respond to and understand other human beings, and to accept full responsibility for the results of his or her actions.

Therefore, the Montgomery County Public Schools dedicates itself to provide the opportunity, encouragement, and guidance to make it possible for every child to attain the following goals of education:

ACADEMIC SKILLS

The fundamental responsibility of the school is to develop programs that enable each child to acquire those skills basic to all learning. The achievement of all other goals depends upon the success of the school in ensuring that each student, according to ability, attains the following basic skills:

- **Reading:** The ability to read and comprehend written material and relate it to other knowledge
- **Composition:** The ability to write with precision, clarity, and acceptable usage, whether to inform, inspire, or persuade
- **Listening and Speaking:** The ability to listen attentively and with understanding and to speak with confidence and effectiveness, whether from written material or extemporaneously
- **Mathematics:** The ability to perform computations, to solve common problems of mathematics and logic, and to understand the structure of mathematics so it can be a useful tool in daily living
- **Study:** The development of basic study skills to acquire knowledge efficiently
- **The Arts:** The development of some of the basic disciplines and skills in the performing and creative arts that may be used throughout life for communication, expression, and enjoyment
- **Observation:** The ability to identify and differentiate elements of the surrounding world that are useful in personal, academic, and artistic pursuits.

PHYSICAL DEVELOPMENT

Each person matures physically at a different rate and possesses differing capabilities. The school has the obligation to help each student:

- understand the biological functioning of the human body
- make the best both of physical talents and limitations
- develop good health habits, skills, and interests to maintain optimum physical condition throughout the course of a lifetime

INTELLECTUAL DEVELOPMENT

In addition to acquiring academic skills, each student's intellectual capabilities should be developed to the fullest

extent possible. Therefore, the school will encourage each pupil:

- to think creatively
- to reason logically
- to apply knowledge usefully
- to deal with abstract concepts
- to solve problems

THE INDIVIDUAL AND SOCIETY

Every person must learn to live in a society. The school must help each student develop an understanding of people and of how the individual depends upon others and they on the individual. This requires that each student gain:

- knowledge of self and the characteristics, needs, and desires each individual shares with others
- sensitivity to others and their ideas, and the ability to act responsibly in various situations
- the ability to function productively as a member of a group
- familiarity with the legal, moral, ethical, and cultural heritages of different societies
- knowledge of the various political systems and philosophies of the world

SCIENTIFIC UNDERSTANDING

People must exist in the natural world. The school must help each student understand nature's impact on us and our impact on nature. This requires that each student gain:

- knowledge of natural phenomena and their effect on the human race
- understanding of scientific advances and their part in modern technology
- understanding of the scientific method
- appreciation of the ways in which the application of scientific principles can improve the quality of life while preserving the natural order

AESTHETIC EXPRESSION

People, to realize their full potential, must be able to sense and appreciate beauty in the world around them, whether created by nature or by human hands. The school must help each student gain:

- knowledge of the nature of the creative and performing arts
- experience with a wide variety of art forms
- a perspective for developing individual aesthetic criteria and tastes
- understanding of the contribution of the arts to human communication

CAREER DEVELOPMENT

Productive and satisfying work enriches our lives; and with increasing leisure time, many people will use various occupational skills for avocational purposes as well. The school must help each student gain:

- knowledge and appreciation of the wide variety and interrelationships of occupations in modern society
- opportunities to explore potential occupations in relation to personal aptitudes and interests, unrestricted by stereotypes of sex, race, or socio-economic level
- the knowledge, skills, and abilities that will enable graduates to secure satisfying employment, embark upon further training and education in a chosen career field, and adapt occupational talents to changing job demands and opportunities

COMMITMENTS

The Board of Education and the staff of the Montgomery County Public Schools must create and maintain an educational environment that promotes the attainment of these goals by all students. Toward this end, therefore, the public schools make the following commitments to the citizens of Montgomery County:

- *To attract and retain the most qualified and best trained staff possible through dynamic programs of recruitment, supervision, and continuing inservice training and staff development opportunities*
- *To develop and implement a comprehensive and flexible instructional program to achieve the aforementioned goals and to provide the facilities, materials, and equipment needed to enhance the effectiveness of the program*
- *To evaluate the effectiveness of the instructional program continuously, and regularly report the findings to students, parents, staff, and the community*
- *To adopt new and different approaches when it is determined that they will contribute more effectively to the fulfillment of the goals*
- *To encourage a continuing dialogue with the entire community, making every effort to communicate needs and achievements, and to be responsive to the needs and aspirations of the school community*
- *To utilize facilities and staff, in cooperation with other agencies, in the development of preschool, community school, and adult education programs that will meet the continuing educational needs of all citizens*
- *To provide an accountability procedure for informing county citizens of the objectives and costs of their school system and of reporting periodically on the educational investments made with their tax dollars.*

a policy statement on

Education of Gifted and Talented Students

POLICY

I. CONDITION

The Montgomery County Board of Education has determined that instruction of gifted and talented students shall be identified as a priority area of concern and that appropriate steps shall be taken to continue to develop systemwide plans that assure provisions for the gifted and talented in each school. Students who are gifted have unique educational needs that should be met if these students are to achieve their full potential.

Montgomery County Public Schools provides a number of differentiated educational programs and/or services beyond those normally provided to the general school population; however, appropriate differentiated programs and/or services are not currently available for all Montgomery County Public Schools' gifted and talented students. The purpose of these programs is to assist students in realizing their contribution to themselves and to society. *(Program refers to the systematic delivery of instruction and services and includes the following components: goals and objectives, implementation plan, identification and selection procedures, curriculum and resources, staff selection and training, and evaluation.)*

Gifted and talented students are those, who by virtue of outstanding abilities, are capable of high performance. These are students who require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and to society. Students capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination:

1. General intellectual ability
2. Specific academic aptitude
3. Creative or productive thinking
4. Leadership ability
5. Visual and performing arts
6. Psychomotor ability

Montgomery County Public Schools adopts this widely used definition and believes that gifted and talented students should be identified by professionally qualified persons. Montgomery County Public Schools has a commitment to meet the needs of gifted and talented students and to assist them in the realization of their potential.

II. PURPOSE

The purpose of this policy is to continue to ensure that Montgomery County Public Schools provide a program of appropriate qualitatively differentiated instruction K-12 and in all subject areas to meet the unique needs of gifted and talented students. The following provisions will be made as gifted and talented programs are to be developed and implemented.

1. **Identification procedures** for all Montgomery County public school students who are gifted and/or talented in any one or combination of the six categories of giftedness in any subject area, K-12, will be developed, implemented, and evaluated.
2. **Curriculum and other resources** that will meet the needs of identified gifted and talented students will be identified, developed, evaluated, disseminated, and revised. These processes shall be continuous.
3. **A variety of organizational options** at the school, cluster, area, and central level, across all grades, will be developed, implemented, and systematically evaluated to provide an appropriate educational experience for identified gifted and talented students.
4. **Selection of staff** will be based upon training and experience in the education of gifted and talented students. This will include awareness and advanced skill level training to ensure qualified personnel for the gifted and talented.

III. PROCESS

The development, maintenance, and evaluation of appropriate programs for gifted and talented students will require that the superintendent:

1. Annually develop implementation and budget plans to achieve the above purposes of this policy.
2. Establish, monitor, and revise as necessary the guidelines for identifying gifted and talented students.
3. Develop curriculum materials and establish resource arrangements to provide instructional materials to meet the unique needs of gifted and talented students.
4. Establish, monitor, and disseminate information about a variety of organizational models for instruction of gifted and talented students.

5. Provide assistance and support to Montgomery County Public Schools' staff in the areas of:

a. Screening and assessment of pupils

b. Needs assessment of schools

c. Planning, developing, implementing, and evaluating programs

d. Personnel selection

e. Staff training and in-service

f. Montgomery County Public Schools' and community awareness

6. Develop and assist in implementing a comprehensive staff awareness program, as well as advanced skill level training programs, aimed at ensuring qualified personnel for the gifted and talented.

7. Systematically evaluate programs/projects.

8. Monitor programs through the Continuum Education Data Application Project.

IV. FEEDBACK

The superintendent will ensure that:

1. Programs for gifted and talented pupils will be identified in the *Directory of Alternative Programs* and *Programs for the Gifted and Talented*, as well as reflected in Montgomery County Public Schools' *Program of Studies*.

2. An annual report on the status and effectiveness of programs for gifted and talented students is submitted to the Board of Education.

APPENDIX C

GIFTED SCIENCE PROJECT STAFF AND THEIR PRIMARY RESPONSIBILITIES

John R. Pancella, Coordinator, Secondary Science and Project Director
Dr. Pancella supervised the project, defined the products needed, handled administrative procedures, and served as liaison between outside agencies and MCPS regarding the project. In addition, he directed the training of teachers and others in the use of project resources.

Gerard F. Consuegra (8/77 to 6/80), Science Specialist
Mr. Consuegra identified and contacted resource persons to participate in the project, identified published materials for the PRF, wrote descriptions of resources for the PRF, and matched resources with SIS objectives. In addition, he designed in-service procedures, trained teachers to use the project materials, interviewed students, matched student interests with resources, and answered questions from teachers and parents regarding the project.

David DuBois (9/77 to 8/79), Evaluation Specialist
Dr. DuBois designed the project evaluation methodology and associated reports and developed preliminary drafts of the proposed data analyses and the evaluation report outline. He began the collection of some data, assisted in contacting potential resource persons to participate in the project, and identified published materials for the PRF.

Susan L. Ott (10/79 to 6/80), Evaluation Specialist
Ms. Ott completed the evaluation of the project. This included the revision of reports and procedures, collecting and analyzing data, and writing the evaluation report. She also assisted in interviewing students, matching student interests with resources, and training teachers to use project materials.

Michael Lawson (9/77 to 12/79), Media Specialist
Mr. Lawson designed resource file sheets for production of the PRF and served as liaison between the project staff and tryout school media specialists. In addition, he processed all books received by the project, assisted in training teachers, and interviewed students.

Terri Baumgardner (9/77 to 10/79), Clerk-typist
Ms. Baumgardner typed all project correspondence during the development of the PRF and the first and second editions of PRF sheets. She also handled messages for the project.

Peg Fagley (11/79 to 6/80), Clerk-typist
In addition to handling messages for the project, Mrs. Fagley typed the final edition of the PRF, typed and mailed letters requesting evaluation reports, and typed the evaluation report and other final documents.

APPENDIX D
SUMMARY SHEET ON THE GIFTED SCIENCE PROJECT

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

SUMMARY

PURPOSE

The Gifted Science Project is federally funded under ESEA, Title IV-C for the identification of resources for individual gifted science students and their teachers. The resources will be used by individual students in Grades 3-8.

The resources will be matched with objectives and topics in the Montgomery County Public Schools (MCPS) Program of Studies. They will include information on scientists, scientific agencies and laboratories, print and nonprint materials, and special activities such as science awards, competitions, and fairs.

ANTICIPATED

The resource bank will provide the individual gifted science student an opportunity for in-depth exploration within areas of his/her interest or aptitude. As a result, existing gifted science resources will be coordinated and made available to an individual gifted student and his/her teacher.

PROJECT ACTIVITIES

The project is planned for three years of funding. During the first year, 1977-78, the staff will collect, organize, and classify science resources. These resources will be correlated with MCPS science instructional objectives. The identified resources will be placed in a microfiche (a form of microfilm) retrieval system. During the second year, 1978-79, the system will be installed on a trial basis in 15 public schools and one parochial school. The project staff will show students and teachers how to use the system and resource bank. Evaluation studies will be conducted and the data will be used to revise the project materials and services.

At the conclusion of the third year of the project, 1979-80, the materials will be made available countywide. Sample project materials will be prepared for dissemination to interested persons outside MCPS. The project will be publicized statewide and nationally.

APPENDIX E

INFORMATION AND MATERIALS FROM LOCAL, STATE, AND NATIONAL GIFTED AND TALENTED PROGRAMS

Arvada West High School, Arvada CO 80001. A First Draft of a Plan for Education of Gifted/Talented Students. Program description. 1976. 13 pp.

Includes program planning, student identification, program development (to have been completed by the 1978-79 school year), staff/community development, evaluation, and description of program types for students (orientation, workshop/seminar, mini-course, honors programs in regular schools, a community mentor program, an extra session in vacation time, and independent study). Subject areas are not specified; the program seems to cover all high school subject areas.

Auburn Public Schools, School District 408, 915 Fourth Street, N.E., Auburn, WA 98002. Student Teacher Enrichment Program (STEP). Information/teacher's materials package. 1978.

Package includes an abstract on the program and samples of curriculum units. The original pilot program was a self-contained, homogeneously grouped, full-day program for 43 fifth- and sixth-grade students. In 1977-78 STEP expanded into the regular classrooms in Grades 3, 4, 7, and 8 by providing materials and in-service training about the needs of gifted students for 10 classroom teachers and four counselors. The instructional methods in all settings are structured around the models of higher level thinking skills defined by Frank Williams and Benjamin Bloom.

Baltimore Department of Education, Office for Gifted and Talented Children, 2300 N. Calvert Street, Baltimore, MD 21208. Elementary Handbook for Children with Talents and Gifts, 1977-78. Program book. 1978. 147 pp.

Program for K-6. Provides screening methodologies for teacher and student nomination for gifted and talented programs in a wide variety of areas. Brief comments are provided on each curriculum area. Subject area sample units with complete purchase information and extensive annotated bibliography are included.

Bibb County Public Schools, 2976 Crestline Drive, Macon, GA 31204. Georgia school district contacts for gifted programs. Contact list; science books and materials list. 1978.

List of contact persons for gifted programs in Georgia's county school systems. Brief list of science books/materials used in Bibb County program, Grades 1-12.

Bucks County Schools, Intermediate Unit No. 22, Cross Keys Building, Routes 611 and 313, Doylestown, PA 18901. High School Science Seminar, 1977-1978. Program information book. 1977-78. 8 pp.

Ten one- or two-session science seminars in 10 areas for mentally and academically gifted high school students with a high interest in science. Primary screening of students is done by counselors and science teachers (with parent approval) and final screening by the Westinghouse Science Talent Search test. Students provide their own transportation. Those conducting the seminars are local scientists working in schools, colleges, government or private laboratories, or industry. Sessions are held at schools or colleges or at the instructors' places of work.

California State Department of Education, 721 Capitol Mall, Sacramento, CA 95814.

- Teaching Gifted Students Social Sciences in Grades Seven through Nine. R.S. Miles and G. Turner. Book. 1977. 49 pp.

- Teaching Gifted Children Science in Grades Seven through Twelve. Paul Brandwein. Book. 1975. 55 pp.

The books are part of a series of subject-area booklets under a project entitled "Development of Teaching Competencies—Gifted and Talented." The book on social sciences includes an overview chapter; chapters on the process of scientific research, applications of research skills in selected social science fields, sample activities regarding study of the Bill of Rights and justice, field study methods for the development of creativity; and selected references. The book on science describes characteristics of gifted students in science, with emphasis on the differences between conventional and singular giftedness. Curricular strategies are discussed in one chapter and the promotion of independent thinking in another chapter.

Centrum Foundation, Ft. Worden State Park, Port Townsend, WA 98368. Experiences in Creativity program. Letter, schedule of sessions, brochure. 1977-78.

Gifted-student workshops in all creative fields and for various grades, elementary through high school. Includes science workshops. Students are nominated by teachers and if possible submit an example of their work in a field or a resumé of their activities. Currently the aesthetic fields are the main topics of workshops. Mind-stretching and growth in creativity are emphasized. The student or sponsoring school pays room and board.

Program staff have found that teacher nominations are fully as useful for identification of the gifted for the program as are formal measuring instruments.

Centrum, a cultural foundation funded by state and private grants and individual contributions, is located at a formerly unused military fort. It offers year-round cultural programming for Washington residents and out-of-state participants.

Connecticut State Department of Education, Bureau of Pupil Personnel and Special Educational Services, Hartford, CN 06115. Conn-Cept II--Differentiated Curriculum for the Gifted and Talented in Science and Mathematics. Program information/materials package. 1978.

Information on the Talcott Mountain Science Center and general units for the gifted student at various grade levels. Brief description of sample Connecticut programs and listing of professional personnel in the area of gifted and talented (all grades). Also included are sample units for gifted students using the Talcott Mountain Science Center.

University of Connecticut School of Education, Storrs, CN 06268. Confratute/'79. Brochure. 1979.

Confratute, a summer institute at the University of Connecticut for those working with gifted and talented programs, is described in a brochure. The institute is an annual one, and Dr. Joseph S. Renzulli is a director.

East Providence School Department, 255 Taunton Avenue, East Providence, RI 02914. Project Gifted. Two program books. 1977-78.

Project Gifted: Overview and Curriculum Guide (61 pp.) is designed to help another school system set up its own gifted program. Extensive admission criteria are detailed in the guide, and forms and additional suggestions are also included. The program begins with intensive screening of all third graders. Fifteen students are accepted into the program, which begins with fourth grade. All students are transported to one school. Students may not concentrate on a single area of interest, but they may develop a strong interest in various fields, such as human behavior, culture, fine arts, physical sciences, or life sciences. A program goal is to help the student develop an understanding of self and the world rather than to learn facts. Parents play an important and continuing role; regular meetings with instructors keep them informed on their children's progress. Also included is a briefer program description book, Gifted Program (32 pp.)

Fernwood, Inc. 1720 Range Line Road, Niles, MI 49120. Fernwood Natural Sciences Program. Letter and one-page sheet on student selection. 1978.

The program is described briefly in a letter, and those interested are invited to write for more details. The program provides "shared-time occupational education" through Fernwood, Inc., in an advanced natural science course for high school students held at a nature center each day. Student identification is based on student interest and on recommendation by teachers and counselors. (The program is also cited in Michigan Department of Education, p. 9 of this bibliography.)

Georgia Department of Education, Division of Curriculum Development and Pupil Personnel Services, Atlanta, GA 30334.

- Global Concepts in Gifted Education. Conference proceedings. 1975. 58 pp.

Summaries of gifted programs and ideas instituted in some Georgia school systems. Activities and areas of emphasis in the education of the gifted, K-12. Specific curriculum areas are not discussed. Topics include personalized reading instruction, guidance, group interactions, and communication skills. One problem the conference attempted to solve was how to encourage the gifted to interact with each other and with other students. Some courses in public speaking and in group dynamics were said to have had good effects.

- Guidelines for In-Service Education: Gifted and Talented. Book. 1976. 43 pp.

  Guidelines for training teachers of the gifted. General principles, sample needs assessment, desirable characteristics of teachers. Bibliography.

Highline Public Schools, P.O. Box 66100, Seattle, WA 66100. Enriched Learning Program. Information package. 1977.

Highline Public Schools Enriched Learning Program provides K-6 students with enriched learning activities. This document describes characteristics of gifted children and includes the program's institutional objectives, learner objectives, and learner evaluation design. Specific curriculum areas are not discussed. Students in the program attend regular classes at one elementary school and for a minimum of five hours a week work with other gifted students in high-level cognitive activities planned and conducted by a specially trained project teacher.

The Gifted Child Society, Inc., 59 Glen Gray Road, Oakland, NJ 07436. The Saturday Workshop. Information/class schedule booklet. 1977. 28 pp.

Saturday classes (9, 10, and 11 A.M.) for children who enter the program by application signed by school principals. Parents must be members of the Gifted Child Society. Tuition per course per family in 1977 was $32.00 for one course and less for two or three. Courses are held at two secondary schools. Children as young as four may enroll, and classes listed are for children K-1 to "4th grade and up" (no upper limit noted). Many faculty are professional teachers, K through college; others are community people such as police and magicians. Many science courses are listed, beginning with the K-1 level.

Hardin Northern Schools, Dola, OH 45835. Physmatics. Program Proposal. 1978. 5 pp.

An alternative procedure for educating gifted high school students in physics and precalculus. Includes rationale, objectives, placement procedures, staffing ratios, description of facilities and equipment needed, description of program, and content outline.

Hattiesburg Public Schools, Hattiesburg, MS 39401. Project REACH: article, 1 p.; project materials, 3 pp. 1977.

The article describes a student-constructed model for deep-space mission simulation. Detailed study of the disciplines involved in space travel was necessary for all those taking part. The project itself includes elementary-level students and carries out many science-related activities as part of its curriculum.

Houston County Gifted Program, Flynt Building, Warner Robins, GA 31093. County program for 1-12. Information package. 1978.

Programs for the gifted in Grades 1 through 12. The elementary program is entitled FOCUS. The Intermediate Science Curriculum Study (ISCS) program is provided for junior high students identified as gifted. Senior high students pursue independent study, the Biological Science Curriculum Study (BSCS), pilot honors courses, and exploration of career interests. The program description gives a brief history of the total program, identification procedures, specific programs of study, and recommendation forms. Sample syllabi and requirements for humanities courses are also included.

Howard County Public Schools, Columbia, MD 21043. Title IV-C Project to Establish Model Learning Laboratories for Gifted and Talented Students at the Elementary School, Middle School and High School Level. Instructional guides.

- Instructional Activities and Strategies for Scientific Problem Solving, rev. ed. Bonnie Daniel, Gerald Einem, Maurice Kalin, Debbie Lederer, Paula Leith. Book. 1977. 77 pp.

  A guide to problem solving for teachers of the gifted; emphasizes both creative and critical thinking. Chapters address stating a problem, stating hypotheses, designing experiments, and analyzing data.

- Instructional Activities for Creative Dance, Grades 4-12. Gerald Einem, Marilyn Byers, Debi Lederer, Paula Leith, Donald McBee, and Anne Ryder. Book. 1978. 77 pp.

  An instructional guide for teachers at each of the three pilot schools (elementary, middle, and high) chosen for testing the program. Modern dance was selected as the type that most fosters creativity. For each level the guide includes terminal objectives, each with enabling objectives, and screening/identification methods for students. The program includes dance, choreography, supporting aspects of dance (costumes and the like), and dance criticism.

- Instructional Activities for Creative Drama, Grades 3-12. Gerald Einem, Paula Leith, Donald McBee, and Ann Ryder. Book. 1977. 41 pp.

  Instructional guide for teachers at each of the three pilot schools (elementary, middle, and high). For each level the guide includes an instructional program with objectives and exercises to fulfill them, suggested additional materials, and identification/screening methods for students. The program includes mime, creating a mood, improvisation, open-ended acting situations, and the writing and performance of plays or poetry.

- Instructional Activities for Creative Music, Grades 3-12. No authors given. Book. 1977. 37 pp.

  Instructional guide for teachers at each of the three pilot schools (elementary, middle, and high). For two levels (elementary/middle and high) the guide includes an instructional program with objectives and exercises for fulfilling them and identification/screening procedures for students. The program includes basic signing notation, sight-reading, and ear-training skills; arranging; composing; and creating movement patterns to music.

- Instructional Activities for Developing Critical Thinking Skills--Elementary, rev. ed. Gerald Einem, Bonnie Daniel, Paula Leith, and Debi Lederer. Book. 1977. 69 pp.

- Instructional Activities for Developing Critical Thinking Skills--Middle School, rev. ed. No authors given. Book. 1978. 123 pp.

- Instructional Activities for Developing Critical Thinking Skills—High School, rev. ed. Gerald Einem, Bonnie Daniel, Maurice Kalin, Debra Lederer, and Paula Leith. Book. 1977. 78 pp.

  These instructional guides for teachers employ the higher levels of thinking mentioned in several taxonomies: Bloom, Guilford, and the Watson-Glaser Critical Thinking Appraisal test, from which the terms used in the program are drawn: assumption, inference, deduction, interpretation, and evaluation. This instrument was used during the project's pilot for the pre- and post-testing of participants. In each of the three guides each type of thinking is discussed in a separate chapter, which includes objectives and exercises for fulfilling them. References with additional exercises are cited in each chapter. A chapter on assessment of student growth and a bibliography are included in the guides for elementary and middle school. The high school guide includes six appendixes: several bibliographies, further explanation of Bloom and Guilford, a glossary, further exercises, student progress evaluation forms.

- Mathematics Games and Puzzles, Elementary Level. Gerald Einem, Debi Lederer, Paula Leith, and Donald McBee. Book. 1978. 113 pp.

  Resource book for teachers. Unlike others in the project series, this book presents only exercises, not objectives or explanations. Topics are calendar study, codes, computers, fractions, geometry, greater than/less than, logic, skill drills, measurement, money, odd/even, patterns probability, Roman numerals, and sets and subsets. Purchase order information is included for commercial resources. Many materials are teacher-made.

- Scientific Research Handbook, High School Level. Gerald Einem, Debi Lederer, Paula Leith, and Donald McBee. Book. 1978. 43 pp.

  This handbook for teachers also includes requirements for student researchers. Chapters discuss (1) identification of students; (2) the research teacher, including teacher obligations, training of students, and use of consultants; (3) library use and information search; and (4) information for students, including problem selection, experimental design, student obligations and rules for research, products, and communication of results. Eleven appendixes present more specific information on the research and writing processes.

The Identification of Resources for Individual Gifted Students in Grades 3-8. David DuBois, Gerard F. Consuegra, and Michael Lawson. Article. 1979. 3 pp.

A reprint from Northern Virginia Council for Gifted/Talented Education, Beyond Awareness (conference proceedings), cited on p.15 of this bibliography. The article is a concise summary of the Gifted Science Project, of which this bibliography is one component. It includes a brief look at the nature of the project; how science resources for the gifted were discovered, obtained, and classified; how teachers were trained to use the project materials; final products of the project; and how the project was evaluated. The project director's name and address are provided for obtaining additional information.

Jefferson County Public Schools, J. Graham Brown Education Center, 675 River City Mall, Louisville, KY 40202. Advance Program. Bibliography. 5 pp. 1978.

Bibliography of social studies and science materials being classroom-tested for use with gifted students. Criteria for selection were as follows: (1) Does the material provide opportunities for hands-on classroom experiences? (2) Does it provide a basis for extending the child's scientific inquiry? (3) Does it provide information essential for a well-rounded understanding of scientific concepts? (4) Are the printed materials written at a level sufficiently challenging for gifted/talented children? A list of publishers and addresses is also provided.

Lake Washington School District Number 414, Kirkland, WA 98033. Information package. 1978.

An ESEA Title IV-C program outlined in a booklet that includes identification procedures and program philosophy, broad goals, characteristics, and evaluation. Evaluation forms and a bibliography of materials are also included. Teachers prepare lesson plans using standard models such as Williams' model, Bloom's taxonomy, a matrix derived from Williams and Bloom, and Models of Teaching by Bruce Joyce and Marsha Weil.

Maryland State Department of Education, Division of Instruction, P.O. Box 8717, BWI Airport, Baltimore, MD 21240. "Maryland's Activities for Gifted and Talented Youngsters." Filmstrip/tape package with script booklet. 1977. Booklet. 15 pp.

Brief survey of Maryland activities for gifted and talented. One of two filmstrips, "Plan and Program," discusses Maryland's state Action Plan and how it is being carried out. The other, "Practice and Performance," describes summer programs for middle, junior high, and senior high school students at three regional demonstration centers. Science, archaelogy, history, and visual arts are emphasized at one of the three centers; creative writing and communications at another; and visual and performing arts, mathematics, and environmental living at the third.

Mercer Island School District No. 400, 4160 86th Avenue, S.E., Mercer Island, WA 98040. District programs for the gifted. Information package. 1978.

Elementary and junior high school programs, housed in seven district schools. A summary of activities at each school is included. Emphasis is on higher order skills (Bloom's taxonomy). Both science curriculum areas and processes that can be used in science are included in the curriculum. The package includes program descriptions and seventh- and eighth-grade curriculum units.

Michigan Department of Education, Lansing, MI 48909. Michigan's 1977-78 Programs for Gifted and Academically Talented Students. Report on programs. 1977. 37 pp.

Description of 12 gifted and talented pilot projects in Michigan for varying levels, K-12. All programs stating curriculum included science topics and processes. One county, Buchanan, uses the Fernwood, Inc. facility (see p. 4 of this bibliography.) Descriptions vary widely in detail. Financial and numerical data are provided, along with a list of contact persons for each project and addresses of organizations dealing with the gifted.

Milford Senior High School, 5735 Pleasant Hill Road, Milford, OH 45150. Milford Futurology Program. Information/program materials package. 1977.

This program for the gifted is primarily for Grades 9-12. The program summary describes its philosophy, goals, organization, methodologies, and evaluation techniques; it also includes a bibliography and a resource list. Sample unit outlines and sample readings and activities are also included for studying a humanistic approach to scientific inquiry. Science examples are related mostly to biology.

Minnesota Department of Education, Capitol Square, 550 Cedar Street, St. Paul, MN 55101. Science Explorations K-6. Book. 1978. 62 pp.

Introduction presents description of a teacher's responsibilities toward and problems with gifted students. The document contains numerous science experiments using common materials. For Grades K-6.

Mobile County Public Schools, Division of Staff Development, Arlington Staff Development Center, 1107 Arlington Street, Mobile, AL 36606. Talents Unlimited Developer-Demonstrator Project. Project information package. 1977.

Not a program for the gifted and talented only. A training package, produced under a Title III project for K-8, offers the services of the school system by contract for three to five days' training. The training lists and describes six ways of thinking. Teachers are encouraged to foster the child's strongest mode of thinking and to encourage creativity in all modes. Included in the package are a slide/tape script, a practicum syllabus, a contract for the training, and an explanatory brochure with an order form for project materials.

Montgomery County Public Schools, 850 Hungerford Drive, Rockville, MD 20850.

- Above & Beyond: A Teacher-Selected Bibliography of Instructional Materials for Use with the Gifted and Talented. Book. 1978. 250 pp.

Bibliographies for K-12, divided into chapters by subject area (aesthetic, English language arts, mathematics, science, social studies, general). Each chapter includes an annotated list of instructional materials and a list of textbooks recommended for the gifted. The English and social studies chapters include specialized bibliographies as well. Finally, there are two sections for teachers themselves: an annotated list of general professional materials on the gifted and a list of materials on the culturally different gifted.

- Initial Report of the Task Force on the Gifted and Talented. July 15, 1975. 69 pp.

  The first sections present an overview of gifted education nationwide, including history, rationale for programs, identification of the gifted, and desirable components of a program. The next sections address Montgomery County's needs, plans, and recommendations. Extensive appendixes cover the following areas of interest to those outside the county: types of curriculum and learning methods, recommended books/materials, program policy and planning overviews, and characteristics of the gifted.

- Instruction of the Academically Gifted in Montgomery County Public Schools. November 25, 1974. 20 pp.

  The paper addresses five questions for the county: Who are the Gifted? Where are they? What is being done for them now? Which of their needs are not being met? What plans does the school system have for improving instruction for them? An appendix reports on a survey regarding various provisions for the gifted in the county school system.

- A Policy Statement on Education of Gifted and Talented Students. November 22, 1978. 2 pp.

  A brief statement on criteria for identifying the gifted, basic provisions for the gifted, program planning requirements, and reporting requirements.

- Procedures for Selection of Elementary Students to Participate in Gifted and Talented Programs. Identification guidelines. 1979. 50 pp.

- Procedures for Selection of Secondary Students to Participate in Gifted and Talented Programs. Identification guidelines. 1979. 46 pp.

  The two booklets present general principles for selecting gifted students; a school selection process; specific procedures for student selection by peers, school staff, and other adults; and nomination forms for the student and parents.

- Recommendations of the Office of Program Development Regarding Long-Range Plans for the Gifted. October 9, 1979. 13 pp.

  Recommendations of the central staff for long-range planning for the gifted. The gifted population was defined as those gifted intellectually or in the visual and performing arts.

- Reports of the Superintendent's Advisory Committee on the Education of the Gifted and Talented. The Committee. Four reports: 1976 (59 pp.), 1977 (26 pp.), 1978 (27 pp.), 1979 (10 pp.).

  The first of these annual reports presents an introduction and background to the establishment of a countywide gifted program, a program definition, a discussion of MCPS efforts in 1975-76, progress assessment, and recommendations for the following year. The following years' reports present updated assessments of the program, specific recommendations related to the assessments, and implications for budget.

Mount Pleasant School District, Washington Street Extension and Marsh Road, Wilmington, DE 19809. Challenge Program. Manual and information sheets. 1978.

A program for 100 gifted children, Grades 3, 4, and 5, in the school district, who are transported to the Challenge Program one full school day a week. Some selections are made through IQ tests, teacher or parent nomination, and group achievement tests. Students may also be recommended through individual psychological evaluation. A major goal is to broaden the extent and depth of knowledge in academic areas through using inquiry and creativity. Teacher-pupil ratio is 10:1. The curriculum combines units prepared by the staff and commercial units adapted by the staff. The program summary includes descriptions and examples of curriculum, activities, and evaluation instruments. Science activities are included in the package.

National/State Leadership Training Institute on the Gifted and Talented (N/S-LTI-G/T), 316 W. Second Street, PH-C, Los Angeles, CA 90012. Information package. 1977.

A federally funded project, administered through the office of the Ventura County, CA, Superintendent of Schools, which contracts with agencies and school systems and offers summer institutes, consultants, establishment of state/local exemplary programs, publications and productions in other media, advocacy services, and training kits/curricula.

Nebraska Department of Education, Programs for the Gifted, 301 Centennial Mall South, Lincoln, NE 68509.

- Bibliography of Gifted Children. Diane Dudley. Photocopied list. 1975. 16 pp.

  Extensive listing of publishers of professional and subject-area materials useful for the gifted. Ordering information (though dated) could be used by someone beginning a gifted program.

- Celebration of Creativity Catalogue. Ed. Dean Frost. Teacher's Guidebook and Student Activity Handbook. Books (bound together). 1977. 469 pp.

  These extensive, creative documents provide activities centering on the nature of creativity and creative thinking. Numerous ideas, questions, and specific lesson plans to use in primary grades are included. About 20 activities center on science. Color-coded sections on theories, thinking, nature of creativity, measurement, and bibliography are included. The catalogue is the product of a U.S. Office of Education grant and consolidates work from many schools across the United States.

- Gifted and Talented: An Introductory Booklet. Booklet. 1978. 23 pp. $1.00.

  To introduce the reader to gifted education--what it is, for whom, where to go for assistance, help available, how to develop gifted children's abilities.

- Gifted Programs Media Resource List. Book. 1976. 17 pp. $.95.

  Unofficial list, based on recommendations by Nebraska teachers, of resources they have used.

- Identification Supplement to Rule 3: Ideas for Identification of Gifted/Talented in the Areas of: Creativity, Leadership, Visual and Performing Arts, Psychomotor Ability. Book. No date. 63 pp. $1.65.

  In addition to the items in the title, the book includes a discussion of what identification does and does not accomplish and rating scales for K, 1, and 2-6.

- Myth-Information about Gifted Education. Book. 1978. 14 pp. $.70.

  Twelve mistaken ideas about the gifted and their education and corrections of these mistakes with facts taken from research.

- National Survey of Exemplary Gifted Programs. Book. 1978. 37 pp. $1.20.

  Results of questionnaires answered by state consultants for gifted programs. Results cover unique/exemplary programs only and include 93 school districts in 23 states.

- Rule 3 Revised: Regulations for Approved Programs and Criteria for the Classification of Gifted/Talented Students; Criteria for the Classification of Culturally and Educationally Deprived. Booklet. 1976. 7 pp. $1.65.

  Nebraska state regulations and requirements in the areas of the title.

- Taxonomy Game. Book. 1977. 32 pp. $1.00.

  To be used for teacher training. Flash cards of activities and questions for children have printed on the reverse side the required level of thinking from the six levels proposed in Bloom's taxonomy.

New Jersey Department of Education, Educational Improvement Center, 207 Delsea Drive (Rt. 47), RD 4, Box 209, Sewell, NJ 08080. Northeast Exchange Project. Information package. 1978.

The Northeast Exchange Project is a five-state consortium on educating the gifted and talented. New Jersey is acting as the state of record through its Department of Education, Division of School Programs. The other states are Connecticut, New Hampshire, Rhode Island, and Vermont. The package contains an anthology of articles by educators on gifted and talented education (64 pp.; $1.00); a group of articles and materials for parents and educators, and a directory of gifted programs in the Northeast Exchange. The package can serve as a background on gifted and talented education.

New Rochelle City School District, 515 North Avenue, New Rochelle, NY 10801. Project Extend. Information and materials package. 1978.

A full-time interdisciplinary program for Grades 5 and 6 students gifted in multiple areas, for the 1976-77 school year. Students attended one school. The program offered replication services (through contract) to selected districts throughout New York state. The program, including replication services, was funded by Title IV-C of ESEA. Science was studied through the interdisciplinary "Biological Portraiture Unit," which concentrated on the lives and achievements of people who have contributed to science. (The unit combined science, mathematics, social studies, language arts, and fine arts.) Included in the package are program objectives, a high-level-skills concentration section, description of selected units implemented in the program, ongoing activities, sample lessons (including two science lessons), a student contract form, and a parent questionnaire for the recruitment of community resources.

Northern Virginia Council for Gifted/Talented Education, 334 N. Washington Street, Falls Church, VA 22046.

- Beyond Awareness (Proceedings of the Fourth Annual Northern Virginia Conference on Gifted/Talented Education). Book. 1979. 156 pp. $5.00.

  The nineteen papers from this conference centered on trends and on innovative thinking and instructional strategies in gifted education. (The paper "Identification of Resources for the Individual Gifted Student in Grades 3-8" concerns the Gifted Science Project of which this bibliography is a part. It is cited on p. 8 of this bibliography.

- Realizing Their Potential (Proceedings of the Third Annual Northern Virginia Conference on Gifted/Talented Education). Book. 1978. 135 pp. $4.75.

  Included in the proceedings are papers on starting, adding to, revising, and improving gifted and talented programs; ways to occupy the gifted student; and educational techniques for the gifted.

Norwalk Public Schools, 105 Main Street, Norwalk, CT 06851.

- Academically Talented Program. Program information/materials package. 1977.

  A gifted and talented program for 315 students, Grades 3-8. Enumerates screening and identification procedures of students for program of small group instruction taught by teachers who travel from school to school. The development of a differentiated curriculum and evaluation techniques are described. Curriculum units in probability (Grade 7), optical illusions (Grade 6), and productive thinking (Grade 6) are summarized.

- Parent Questionnaires for the Academically Talented and Artistically Talented.

  A list of open-ended questions for evaluating gifted and talented programs. Three questions concern academic programs, and five concern art programs.

Nueva Day School and Learning Center, 6565 Skyline Boulevard, Hillsborough, CA 94010. Private school. Program materials package; letter. 1977. Includes 2 books @ $2.50.

- The Ecological Theme As a Basis for Individualized Science Experiences (D. J. Alberti; 34 pp.).

  Gives 31 projects illustrating the process approach to science teaching, in which the effort is to understand what is happening rather than mere factual content.

- Individualizing Science (D. J. Alberti; 36 pp.).

  Presents questions and answers about how to start an individualized program for science students. Information sheets are included on developing a science program for gifted students, ages four through sixth grade (the age range for Nueva students). The science curriculum is activity-centered and is based on several National Science Foundation elementary science curriculum projects that incorporate process skills with mathematics and other academic disciplines.

Oak Harbor Schools, 1260 Midway Boulevard, Oak Harbor, WA 98277. Challenge Program. Grant application. 1978.

A grant application for state funding to continue an existing program for the gifted. The population definition includes intellectual and creative gifts, with emphasis on the intellectual. Identification was to be made through nomination by teachers, parents, and peers and through standardized tests, including assessment of the culturally disadvantaged. The program was to serve 2.4% of the K-6 school-district population (60 students). Each student was to spend a full class day a week, by grade level, in the Challenge Program classroom, which was to be housed in a junior high school. Classes were to be small, and laboratories were available. Staff, which included one teacher and a project director, had expertise in specialized areas. Goals included the transfer of skills and other effects back to the home classroom. Emphasized were science, mathematics, and language. A mentorship was provided for Grade 6 children.

Ohio Department of Education, Division of Special Education, 933 High Street, Worthington, OH 43085. Program Standards for School Foundation Units for Gifted Children. Book. 1975. 4 pp.

Ohio guidelines for identifying intellectually gifted and talented students.

Omak Public Schools, District No. 19, Omak, WA 98841. Gifted program. Program materials package. 1978.

No written curriculum is given (1978 was the first year of the program). Grades 7 through 12 are served, but the information reviewed does not include number of pupils or of schools. Included are several projects and activities for all the grades in the program, under the headings "Science Fiction," "News Media," and "Product Development." Bibliographies and lists of other materials are also included.

Onondaga-Madison Board of Cooperative Educational Services (BOCES), 6820 Thompson Road, Syracuse, NY 13211. Onondaga-Madison Educational Service Center for the Gifted and Talented. Information and materials package. 1978.

Funded by Title IV-C, the project is an extension of the services offered through BOCES. It is an intermediate unit serving 18 school districts and does not deal directly with students. Products generated through the project include: (1) Identifying the Gifted and Talented--A User's Guide, (2) an annotated bibliography of materials for the gifted and talented, (3) Programming for the Gifted and Talented--A User's Guide, and (4) Creativities: Assorted Classroom Enrichment Activities for the Gifted and Talented.

Palo Alto Unified School District, Elementary Education Department, 25 Churchill Avenue, Palo Alto, CA 94306. Project materials for the gifted. 1977.

Descriptions of the following units designed for fourth and fifth graders: "Elements in a Study of Flight," "Science Through Cooking," and "Science Experiments You Can Eat."

Pennsylvania Department of Education, Box 911, Harrisburg, PA 17126. Pennsylvania Association for Gifted Education. Information/materials package. 1978 and 1979.

The package includes the following: (1) a directory of school-district gifted programs in the state, with complete mailing addresses; (2) two articles pertaining to gifted education, by Jean Farr for the Pennsylvania Science Association; (3) a sample publication from the Pennsylvania Association for Gifted Education, listing cognitive and emotional factors in the family that aid children's development; and (4) a summary of a Pennsylvania court case determining that a gifted child had to be supplied with an educational program for the gifted by her school district.

Providence School Department, Research, Planning, and Evaluation Division, 150 Washington Street, Providence, RI 02903. Providence Program for the Gifted. Program description. 1978.

The Providence pilot program for 100 academically and creatively gifted and talented children serves Grades 1-5 at the Edmund W. Flynn Model Elementary School. Goals of the program are listed. Types of programs include special classrooms in regular schools, enrichment within the regular classroom, cluster groups in a subject area (non-graded), and independent study. A description of the program's second-year proposed program is also included.

Puerto Rico, Commonwealth of, Department of Education, Science Programs Office, Hato Rey, Puerto Rico. Proyecto de Atencion Especial a Estudiantes de Ciencias y Matematicas. Program materials package in Spanish. 1978.

Project for the gifted in one secondary school (Grades 7-12). The school population includes 105 seventh graders. Materials include biology content outlines with objectives and evaluation criteria, a list of behavioral objectives, a curriculum, a syllabus, and a list of equipment and materials needed.

Richland School District, 615 Snow Avenue, Richland, WA 99352. Alpha Program. Information/program materials. 1979.

One-page overview of the Alpha program: student identification, organization, population size, and main techniques of instruction. Subject areas are not identified. The federally funded program runs five hours a week for each student. Students are taken out of the regular classroom and taught by a special teacher. A two-page teachers' observation guide for identifying the gifted is also included.

Snohomish School District No. 201, Administration Office, 1506 Fifth Street, Snohomish, WA 98290. TREK program. Brief descriptive letter. 1978.

The TREK program for gifted and talented elementary students has the following format: sixty gifted students, Grades 1-6, are identified from five elementary schools by means of teacher nomination, achievement scores, a parent checklist, and the Torrance Test of Creative Thinking. The elementary librarian in each school works with small groups of TREK students each day. Each student receives five hours of instruction per week. All instruction is aimed at developing higher levels of creative thinking. Total evaluation is based on teacher evaluations, parent advisory committee assessment, pupil products, and thinking skills tests.

Suffolk County Third Supervisory District, Board of Cooperative Educational Services, 507 Deer Park Road, Dix Hills, NY 11746. Institute for Talented Youth. Information and materials package. 1977.

The Institute, aimed at the secondary level, is funded by and serves 12 of the school districts that are served by the Board of Cooperative Educational Services (BOCES). The Institute lasted for four weeks in summer, and each student took one elective for three hours each morning plus a required humanities series for one hour each morning. Science courses in 1977 were computer mathematics and marine biology. Materials in the package are an evaluation report; an information catalogue; and A Sense of Life, a magazine of creative writing and photography by Institute students.

Tennessee State Department of Education, 103 Cordell Hull Building, Nashville, TN 37219. Program for the gifted. Information package. 1978.

A collage of various objectives, descriptions of the gifted, identification procedures, Tennessee local programs, summaries of types of curricula for the gifted (differentiating them from regular curricula), articles on the gifted (including female and culturally differing students), and references.

Texas Education Agency, Gifted and Talented Students Program, Office of Educational Programs for Special Populations, 201 East 11th Street, Austin, TX 78701. Materials on the education of the gifted and talented. Information package. 1978.

Rationale, goals, objectives, alternatives, strategies for instruction, and evaluation procedures for state gifted programs. Package includes a brochure and State Plans for the Education of the Gifted and Talented (15 pp.), both from TEA; and a reprint on Texas gifted education, "The Gifted, Talented Child," from Texas Outlook, journal of the Texas State Teachers Association.

Tucson School District, Robert D. Morrow Education Center, P.O. Box 4040, 1010 East Tenth Street, Tucson, AZ 85717. Tucson Unified School District for Gifted and Talented Education (GATE). Preprinted memo; brochure. 1978-79.

The GATE program has 16 self-contained classrooms ranging from K through high school. The focus is on horizontal growth rather than acceleration. Students are encouraged to explore many content areas, media resources, and opportunities and to pursue topics in depth.

Ventura County Superintendent of Schools Office, Ventura, CA, and National/ State Leadership Training Institute on the Gifted and Talented (N/S-LTI-G/T).

- A Guidebook for Evaluating Programs for the Gifted and Talented. Joseph S. Renzulli. Book (working draft). 1975. 227 pp. $5.50.

  Chapters are included on the need for evaluation; models and concepts; designing an evaluation for a school system, including all steps and practical problems; and selecting and contracting with an evaluator. Bibliographies, sample instruments, and a sample contract are also presented. The author addresses the book to five audiences: (1) those who must carry out or take responsibility for evaluation, though not professional evaluators, such as local school system persons given the responsibility for developing an evaluation; (2) state department consultants expected to offer technical assistance in evaluation; (3) those responsible for selecting an outside evaluator and negotiating a contract; (4) state department policy and decision makers; and (5) professional evaluators.

- The Identification of the Gifted and Talented. Ruth A. Martinson. Book. 1974. 145 pp.

  A thorough, lucid examination of many possible forms and questionnaires for use in determining gifted students. A resource for any school wishing to set up a program for the gifted.

- Providing Programs for the Gifted and Talented. Sandra N. Kaplan. Book. 1974. 246 pp.

  This handbook presents information for developing programs for the gifted and talented, worksheets on which to apply knowledge gained, and models illustrating successful program ideas.

Wicomico County Board of Education, Gifted and Talented Program, Long Avenue and Mt. Hermon Road, Salisbury, MD 21801. Project TAD. Curriculum book. 1977-78. 365 pp. $5.00.

Book is a curriculum guide, locally produced by teachers, for Grades 1-6. All curriculum areas are covered, and there are separate chapters on biology and physics. Opening chapters address characteristics of gifted and creative children and critical thinking processes. Another section is entitled "Problems and Possible Solutions of Gifted Students Within the Regular Classroom."

APPENDIX F
EXAMPLES OF SCIENCE INSTRUCTIONAL SYSTEM (SIS) OBJECTIVES AND TOPICS

The Science Instructional System of MCPS is divided into six topics:

Energy
Lab Skills - Nature of Science
Living Things
Living Things - Environment
Matter
Universe in Change

Approximately 20 instructional objectives are specified for each of the topics for each grade level. The following are typical examples of science objectives to which GSP resources are coded.

Level 3, Matter

Objective: Demonstrate that condensation is a result of water vapor in the air coming in contact with a cooling surface.

Level 5, Energy

Objective: Describe that any change in motion is caused by unbalanced forces.

Level 7, Living Things

Objective: Analyze food to determine the nutrient content.

APPENDIX G

RESOURCE CATEGORIES AND EXAMPLES IN THE PRF

********** COMMUNITY RESOURCES **********

1. Activities - demonstrations, investigations, or experiments that are identified and supervised by resource persons and that support selected topics and objectives.
   Example: The student will help a forester conduct an inventory of woodland plants and environmental conditions in a forest environment.

2. Awards and Competitions - recognition earned by developing and presenting a science project or paper.
   Example: The student will participate in the Montgomery Area Science Fair.

3. Courses, Lectures, and Seminars - science programs sponsored by educational institutions or organizations.
   Example: The student will attend a health seminar sponsored by the National Institutes of Health.

4. Libraries - specialized collections of science-related media.
   Example: The student will use the Medowside Nature Center Library under the direction of a naturalist.

5. Mentors - resource persons who discuss by telephone or in person science topics and objectives and might suggest reading material, ideas for further work, and other resources.
   Example: The student will meet with a scientist from NASA and discuss the student's interests.

6. Visits - behind-the-scenes tours not normally available to the public or public tours related to science topics and objectives.
   Example: The student will tour the University of Maryland cyclotron.

********* PUBLISHED MATERIALS *********

1. Career Information - published materials that describe science or science-related jobs and careers.
   Example: The student will use the book Veterinary Medicine and Animal Care Careers to learn about science careers.

2. Project Ideas - published materials that describe science investigations for use by students on an individual basis or with a resource person.
   Example: The student will use the book Adventures in Electrochemistry to develop a science project.

3. Science Processes - published materials that describe science procedures and skills, such as laboratory techniques; suggestions for science problem solving; and the collection, processing, analysis, and presentation of data.
   Example: The student will use the book How to Make Your Science Project Scientific to develop science process skills.

APPENDIX H

SOURCES OF RESOURCES: COMMUNITY RESOURCE DIRECTORIES

Access National Parks: A Guide for Handicapped Visitors. Washington, DC: National Park Service, 1978.

Describes where obstacles have been eliminated and where they still exist in U.S. National Parks. May be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (Stock No. 024-005-00691-5).

Citizen's Guide to Services and 1977 Annual Report, Montgomery County Government. Rockville, MD: Montgomery County Government, 1977.

Describes functions and activities of government offices and departments and their responsibilities. Also provides telephone numbers and information about specific services available.

Directory of Community Resources. Montgomery County, MD: Information and Referral Center, 1979.

Annotated descriptions of community resources available to Montgomery County citizens.

Directory of the Joint Board on Science and Engineering Education--'78-79. Bethesda, MD: Washington Academy of Sciences, 1979.

Listing of secondary school contact members for projects and programs in the greater Washington, DC, area. Grants, tours, and science fairs are described.

Environmental Education Resource Guide. Rockville, MD: Montgomery County Public Schools, Division of Physical Health, Driver and Environment Education, 1978.

For teachers who wish to supplement regular programs with environmental studies. Includes resource lists for field trips, newsletters, bibliographies, and human resources.

The Green Press. Chevy Chase, MD: Audubon Naturalist Society, 1980.

Directory of environmental education resources in and around the Montgomery County, MD, area.

Learning Outside the School. Rockville, MD: Montgomery County Public Schools, 1975.

Provides data about agencies and possible locations for field trips in the greater Washington area. Shows how visits can be correlated with MCPS curriculum.

Maryland Children's Guide. Baltimore, MD: Urban Affairs Publishing Co., 1977.

Lists 365 places and events for children and adults, including, among others, tours, science, theater, education, and recreation.

Maryland Guide. Michael M. Reynolds. Adelphi, MD: Research & Reference Publications, Inc., 1976.

Provides information and directory listings for rumerous publications and topics including associations, agriculture, education, genealogy, history, medicine, natural resources, sciences, and transportation. Some references identify resources for field trips.

Rainbow Directory of Agencies and Organizations in Montgomery County, Maryland. Rockville, MD: Montgomery United Way, 1978.

Names, addresses, and executives of Montgomery County agencies; businesses; civic groups; political, veterans', seniors', and men's and women's organizations, centers, and associations.

Resources Directory of Handicapped Scientists. J.A. Owens, M.R. Redden, and J.W. Brown. Washington, DC: American Association for the Advancement of Science, 1979.

Names, addresses, and telephone numbers of handicapped scientists. In addition, their scientific disciplines, degrees in field, the nature of their handicaps, and a coded list of areas of expertise and consulting interests are enumerated. Organized by geographic location.

Science in the Maryland Marketplace. Annapolis, MD: Department of Economic and Commercial Development, 1978-79.

Describes Maryland research, development and science-oriented firms, state and federal research and development activities, universities, professional organizations, and information sources.

Women Scientists Roster. I.R. Weiss and C. Place. Washington, DC: National Science Teachers Association, 1979. Publication No. 471-14762.

Directory developed as a part of the National Science Foundation's Visiting Women's Scientists Program; provides mailing addresses, specific fields of expertise, racial or ethnic background, 1978 employment background, and highest academic degree attained. Geographically organized by zip codes.

APPENDIX I
SPEAKERS' BUREAUS

PUBLISHED LIST AVAILABLE

Applied Physics Laboratory Speakers' Bureau
Mrs. Jeanne Von Schultz, External Relations Office
The Johns Hopkins University
Baltimore, MD 21218
PHONE: (301) 792-7800
(301) 953-7100

Audubon Naturalist Society Speakers' Bureau
8940 Jones Mill Rd., NW
Washington, D.C. 20015
PHONE: 652-9188

Brookside Gardens
1400 Glenallen Ave.
Wheaton, MD 20902
PHONE: 949-8230

C & P Telephone Company
Wheaton Plaza Office Building
Wheaton, MD 20902
PHONE: 468-3418

Montgomery College Speakers' Bureau
Public Information Office
Attention: Program Chairman
Montgomery College
Rockville, MD 20850
PHONE: 762-6088 ext. 313

Montgomery General Hospital
18101 Prince Phillips Dr.
Olney, MD 20832
PHONE: 774-7800

National Institutes of Health
Special Events Clinical Center
Attention: Linda Truit or Debbie Trower
900 Rockville Pike
Bethesda, MD 20205
PHONE: 496-3475

PEPCO Educational Services Program for Schools (list available to teachers only)
Jill Downs
1900 Pennsylvania Ave., NW, Room 520
Washington, DC 20068
PHONE: 872-3570

PEPCO Speakers' Bureau
Jill Downs
1900 Pennsylvania Ave., NW, Room 520
Washington, DC 20068
PHONE: 872-3570

Suburban Hospital Speakers' Bureau
Public Relations Department
8600 Old Georgetown Rd.
Bethesda, MD 20014
PHONE: 530-2580

U.S. Department of Agriculture
Visitors Center
Building 186, BARC-East
USDA Research Center
Beltsville, MD 20705
PHONE: 344-2483

Vitro Laboratories Division
Automation Industries Inc., Speakers' Bureau
Ruth Schneider
14000 Georgia Ave.
Silver Spring, MD 20910
PHONE: 871-7200

Washington Hospital Center Speakers' Bureau
110 Irving St., NW
Washington, DC 20010
PHONE: 541-6301

NO PUBLISHED LIST AVAILABLE

American Association for the Advancement of Science
Dr. Arthur Livermore
1515 Massachusetts Ave., NW
Washington, DC 20036
PHONE: 467-4464

The American University News Bureau
Ms. Jody Golden
The American University
Lett's Hall Basement
Washington, DC 20016
PHONE: 686-2100

Association for Computing Machinery
Washington, DC Chapter
Ms. L. Gioconda, Chairperson, Speakers' Bureau
P.O. Box 6228
Washington, DC 20015

Montgomery County Animal Shelter
Humane Education Director
1420 Gude Dr.
Rockville, MD 20850
PHONE: 279-7560

National Bureau of Standards
Mary Reyner, Community Outreach Coordinator
Gaithersburg, MD 20234
PHONE: 921-2721

Naval Surface Weapons Center
Mr. Earl N. Gray, Community Relations
White Oak Laboratory
Silver Spring, MD 20910
PHONE: 394-3865

University of Maryland Speakers' Bureau
Mrs. Jean Greenwald
Main Administration Bldg., Room 2119
College Park, MD 20740
PHONE: 454-5777

APPENDIX J
INFORMATION SHEET FOR COMMUNITY RESOURCE PERSONS

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

Thank you for your recent conversation with one of our staff members. A copy of our project summary is enclosed. Also enclosed is a list of science objectives for you to review. Please examine them and determine whether you are able to support one or more of them.

Your participation in the project may take one or more of the following four forms.

1. Activity. Activities are identified by you which will support selected topics or objectives. This activity is briefly described in the Project Resource File. The student meets with you and completes the activity.

2. Career Information. An informal appointment is arranged between you and the student. This appointment may be in person or by telephone. During this meeting information regarding careers in your field is discussed.

3. Mentor. An informal appointment is arranged between you and the student. This appointment may be in person or by telephone. During this meeting selected topics and objectives are discussed. Additional resources, reading material, or ideas for further work might be suggested. As a result of this meeting, the student might complete an activity at home or under your supervision.

4. Visit. The student meets with you and receives a tour of a science or science-related facility. This might be a behind-the-scenes tour to observe activities or procedures not normally available to the public or part of a public tour. Selected topics and objectives are related to the tour by you or your designate.

A staff member will call you to discuss further your participation in the project and to answer any questions.

We appreciate your consideration and interest in our project.

Sincerely,

John R. Pancella
Coordinator, Secondary Science
and Project Director

JRP:pf

Enclosures

APPENDIX K

METHODS OF ENLISTING SUPPORT FOR THE GIFTED SCIENCE PROJECT

GSP staff gave presentations describing the project to the following:

Goddard Space Flight Center
MCPS Retired Teachers Association
Naval Facilities Engineering Command
Naval Surface Weapons Center

News releases about the GSP were sent to the following for inclusion in newsletters:

Association for the Development and Advancement of Black Students and Engineers
Audubon Naturalist Society
David W. Taylor Naval Ship Research and Development Center
General Electric Corporation
MCPS Retired Teachers Association
Metropolitan Washington MENSA

GSP staff sent information about the project to the following for departmental discussions:

Bechtel Corporation
General Electric Corporation
IBM Corporation
Litton Bionetics
MCPS Science Resource Teachers
Nuclear Regulatory Commission
University of Maryland Chemistry Department

Information for posters were sent to the following:

Goddard Space Flight Center
Naval Facilities Engineering Command

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

APPENDIX L

AFFIRMATIVE ACTION LETTER

Dear

The Montgomery County Public Schools has a federally funded project for identifying science resources for gifted students. We are seeking your assistance in locating potential science mentors who represent female and/or minority groups. A copy of our project summary is enclosed.

We would appreciate your suggestions on ways in which your organization might work with us. Your recommendations for additional steps in locating female/minority resources would be appreciated. Please call or write the project office if you are able to help or if you need further information.

Sincerely,

John R. Pancella
Coordinator, Secondary Scinece
and Project Director

JRP:ky

Enclosure

APPENDIX M

EXAMPLE OF PRF PUBLISHED MATERIALS SHEET

GRADE: 3-5

TOPIC: MATTER

CATEGORY: PROJECT IDEAS

TITLE: CUP AND SAUCER CHEMISTRY

AUTHOR: NATHAN SHALIT

PUBLISHER: GROSSET AND DUNLAP

COPYRIGHT: 1972

PRICE: $2.95 (93 PAGES, PAPER)

SBN NUMBER: 0-448-11690-1

SPECIAL INSTRUCTIONS: SOME OF THE SUGGESTED ACTIVITIES REQUIRE THE USE OF CHEMICALS, OTHER MATERIALS, OR PROCEDURES WHICH SHOULD BE SUPERVISED BY A QUALIFIED ADULT.

DESCRIPTION: CHEMISTRY INVESTIGATIONS THAT USE COMMON HOUSEHOLD SUPPLIES ARE DESCRIBED AND ILLUSTRATED. THE INVESTIGATIONS ARE VARIED AND RANGE FROM ACIDS AND BASES TO PRECIPITATES AND SPECIFIC GRAVITY.

APPENDIX N

GIFTED SCIENCE PROJECT OBJECTIVES

Gifted Science Project
A Supplementary Education Service
for
Gifted Students and Their Teachers-Science
ESEA, Title IV, Part C

Developmental

1. The resource categories related to education for the gifted available to MCPS will be identified.

2. The bank of basic and supplementary instructional objectives for the science curriculum will be completed for Grades 3-8.

3. The resources available in each category will be identified and cross-referenced to the bank of basic objectives for the science curriculum.

4. The identified resources will be placed into a microfiche retrieval system.

5. A staff in-service training program will be developed and administered.

6. The system for retrieving the resources will be installed in the central media center and 16 local school media centers.

7. The tryout of the project will be completed.

8. The design for a systemwide organization, administration, and dissemination of services will be completed.

9. Sample project materials will be prepared for dissemination to interested persons and the project will be publicized statewide and nationally.

Evaluative

10. The history of utilization of identified resources prior to the onset of the project will be compiled to establish the data base.

11. The utilization study for the 1979 calendar year will be completed.

12. The quality of each resource or activity will be evaluated by the users.

13. Student, teacher and mentor satisfaction with the administration and services provided by the project will be evaluated.

14. The assessment of program effectiveness during the first project year will be completed.

15. Required revisions to the project activities will be identified.

16. The bank of basic instructional objectives and enrichment objectives for gifted and talented students will be revised as indicated from the project evaluation efforts.

17. The resource retrieval system will be modified as indicated from the project evaluation efforts.

18. A cost-effectiveness study of utilization will be completed.

APPENDIX O
LETTERS AND REPORTS USED TO ADD RESOURCES TO THE PRF

ADDING A NEW RESOURCE TO THE PRF IN THE RESOURCE CATEGORIES: ACTIVITY, CAREER INFORMATION (PERSON), MENTOR, AND VISIT

I. Initial contact
   - A. Describe the project
   - B. Determine interest
   - C. Describe need and use of PRF by teachers
   - D. Describe appropriate resource categories
   - E. Determine science topics or interest areas of resource person
   - F. Obtain mailing address

II. Initial written communication
   - A. Select appropriate objectives for resource person's consideration
   - B. Prepare package for director's signature
     1. Cover letter (information and objectives)
     2. List of SIS objectives suggested for the resource person to support.
     3. Project Summary
     4. Two carbons of cover letter and objectives list
   - C. Distribute packet
     1. Original set to resource person
     2. 1 carbon set to reading file
     3. 1 carbon set to resource entries file (file labeled and cross-referenced)

III. Follow-up contact (telephone or in person)
   - A. Determine resource category(ies) for participation
   - B. Determine grade levels and objectives desired to support
   - C. Obtain contact information and participation details
     1. Name
     2. Job title or other professional title
     3. Mailing address
     4. Telephone
     5. Hours for teacher contact
     6. Contact procedures
     7. Special considerations (e.g., contact address if different from mailing address, handicap restrictions, unusual arrangements, alternate contact procedures)

IV. Follow-up written communication
- A. Compose resource description sheet
  1. Obtain team editing and approval
  2. Obtain director's editing and approval
- B. Final-type description sheet using Tech III ribbon and Xerox two copies
- C. Update objectives list
- D. Prepare package for director's signature
  1. Cover letter (confirmation of participation)
  2. List of SIS objectives confirmed that the resource person will support.
  3. Two copies of resource information sheet
     a. Stamped "Return to Gifted Science Project Office"
     b. Unstamped
  4. RESOURCE SURVEY, if appropriate (stamped "Return to Gifted Science Project Office")
  5. Franked return envelope
  6. INFORMATION FOR A RESOURCE PERSON
  7. Two carbons of cover letter and objectives list
- E. Distribute packet
  1. Original set to resource person
  2. 1 carbon set to reading file
  3. 1 carbon set to resource entries file

V. Entry into PRF
- A. Make corrections to original information sheet based on returned sheet
- B. File returned information sheet and resource survey in evaluation file
- C. Xerox required number of copies
- D. Add number to the top of each copy
- E. File original information sheet with PRF originals

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

JOHN R. PANCELLA, ED. D
Project Director
DAVID D. DUBOIS, PH. D.
Evaluation Specialist
MICHAEL E. LAWSON
Media Specialist
GERARD F. CONSUEGRA
Science Specialist

The purpose of this questionnaire is to obtain information regarding the type of participation you would like to assume.

Name _____ Position _____

Business Address _____

Work Phone _____ Home Phone (Optional)_____

Science speciality, training, or interest:

Grade level(s) preferred:

Type of participation desired:

Limitations or restrictions:

Concerns, questions, or suggestions:

We appreciate your interest in our project and the educational experiences of gifted science students. You will be contacted in the near future.

7/79

CONFERENCE REPORT INTERVIEWER: _____ DATE: _____

Name: _____ Agency: _____

Job Title: _____ Address: _____

Telephone: _____ WORK _____ HOME _____

Method and time of contact: _____ Science specialities: _____

Age/grade levels: _____ Restrictions: _____

Willing to interview with a student to determine mutual areas of interest ☐ YES ☐ NO

Prerequisite skills: _____ COMMENT: _____

Notes: (MCPS Topics)

Follow-up plans:

Limiting Factors

Physical considerations
- Cost/fees
- Transportation
- Parking
- Lunch facilities

Field considerations
- Lab, safety, and fire regulations
- Protective equipment and clothing
- Contact lenses
- Allergies
- Insurance

Required guidelines
- Equal opportunity
- Handicapped facilities

Other considerations

☐ Check here when post-conference letter has been mailed.

FINAL 11/29/77

APPENDIX O (CONTINUED)
LETTERS AND REPORTS USED TO ADD RESOURCES TO THE PRF
(Follow-up contact information sheet used before PRF sheet was developed)

APPENDIX O (CONTINUED)

LETTERS AND REPORTS USED TO ADD RESOURCES TO THE PRF
(To suggest SIS objectives the resource person could support)

Grade	Objective
3	Identify distinguishing characteristics of different classes of animals.
3	Identify plants and animals in a community that are dependent upon one another.
3	Identify that environmental factors influence plant and animal growth.
4	Identify that each organism in a food chain performs a distinct role.
5	Describe energy interdependence among living things in their environment.
5	Identify primary and secondary consumers, producers, and decomposers within a food chain.
7	Explain behavior in organisms in terms of stimuli and response.
7	Construct a food web that shows the food relationship in a community.

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

We want to thank you for consenting to serve as one of our project resources.

A copy of INFORMATION FOR A PROJECT RESOURCE PERSON is enclosed. This is to further acquaint you with the Gifted Science Project objectives and procedures. Please keep this information sheet for future reference.

Also enclosed are the list of objectives that you have agreed to support and two copies of the information sheet(s) which show how your contribution will be described to the 16 schools in our tryout study. One copy is for your files and the other is to be reviewed and returned to us. Please read the information sheet(s) and make your corrections, if any. If there are no corrections, verify this for us by writing your initials at the top of the sheet(s).

In order to satisfy our obligation to evaluate the project, we need some additional information. Enclosed is a RESOURCE SURVEY to describe the services you provided to gifted science students prior to the project tryout. Please complete this report to help us meet the objectives for our federal-state grant.

Use the enclosed stamped envelope to return the accepted or corrected information sheet(s) and the RESOURCE SURVEY.

We are asking that your information reach us within two weeks of your receipt of this letter. If you have any questions on this, or questions or concerns about your participation, please call us at 279-3500.

Thank you for helping to support our project. Your contribution is important to us.

Sincerely,

John R. Pancella
Coordinator, Secondary Science
and Project Director

JRP/p

Enclosures

INFORMATION FOR A PROJECT RESOURCE PERSON

Purpose of the Project

The Gifted Science Project is federally funded under ESEA, Title IV-C for the identification of resources for individual gifted science students, Grades 3-8, and their teachers.

Objectives

The objectives of the project are to identify science resources for gifted students and to provide individual gifted students an opportunity for in-depth exploration. The project's emphases are on the identification and acquisition of existing resources rather than the development of new materials.

Pilot Schools

The system will be installed on a trial basis in the 16 schools in Montgomery County listed below. The project grade levels for each school are enclosed in parentheses.

Montgomery County Public Schools

Argyle Junior High School	(7-8)	Piney Branch Elementary School	(4-6)
Benjamin Banneker Junior High School	(7-8)	Potomac Elementary School	(3-6)
Beverly Farms Elementary School	(3-6)	Ridgeview Junior High School	(7-8)
Cashell Elementary School	(3-6)	Tilden Junior High School	(7-8)
Cresthaven Elementary School	(3-6)	Westbrook Elementary School	(3-6)
Germantown Elementary School	(3-6)	Western Junior High School	(7-8)
Grosvenor Elementary School	(3-6)	Whetstone Elementary School	(3-6)
Mill Creek Towne Elementary School	(3-6)		

Montgomery County Catholic School

Little Flower Elementary School	(3-8)

Procedures for Contacting a Resource Person

The teacher will select a resource from the Project Resource File and will discuss the possibility of using the resource with the parent(s) and student. If mutual interest exists, the teacher will telephone the resource person. The teacher will identify his/her school and the student's grade. If the resource person can help the student, tentative arrangements will be made. The teacher will speak with the parent(s) and student regarding the arrangements. Initial contact between the student and the resource person could be by telephone or in parson.

Irregular Requests

The project staff wants to monitor the use of project resources. Project resource persons are requested to call the project staff at 279-3500 and describe any irregular request or questionable uses of the resource person's agreement to participate in the project.

Specifically, these irregularities might include:

1. A procedure by a teacher or student which is inconsistent with the procedures described earlier.

2. A request from a non-pilot school teacher or from a pilot school teacher for a student in a grade other than those listed in the Project Resource File.

3. A request for assistance which is inconsistent with the resource person's commitment as it currently appears in the Project Resource File.

Feedback From a Resource Person

After the resource person helps a student, the resource person will receive a RESOURCE PERSON FEEDBACK REPORT. This report will provide the project staff with information on the student's science experiences while he/she worked with the resource person. A stamped addressed envelope will be provided for returning the completed report.

Assistance From the Project Staff

Resource persons are invited to call the project staff at any time between 8:30 a.m. and 5:00 p.m. for answers to questions and for additional information or assistance. The phone number is 279-3500.

INFORMATION FOR A PROJECT RESOURCE PERSON

Purpose of the Project

The Gifted Science Project was federally funded under ESEA, Title IV-C from 1977 to 1980 for the identification of resources for individual gifted science students, Grades 3-8, and their teachers. The project was installed on a trial basis in 16 schools in Montgomery County.

Objectives

The objectives of the project were to identify science resources for gifted students and to provide individual gifted students an opportunity for in-depth exploration. The product was a resource file for the identification and use of existing resources rather than the development of new curricular materials. The product was prepared for countywide implementation in September 1980.

Procedures Teachers Will Use to Contact a Resource Person

The teacher will select a resource from the Project Resource File and will discuss the possibility of using the resource with the parent(s) and student. If interest exists, the teacher will telephone the resource person. The teacher will identify his/her school, the student's grade, and the student's interest. If the resource person can help the student, tentative arrangements will be made. The teacher will speak with the parent(s) and student regarding the arrangements. Initial contact between the student and the resource person could be by telephone or in person.

Irregular Requests

Project resource persons are requested to call the project staff at 279-3500 and describe any irregular request or questionable use of the resource person's agreement to participate in the project. The following are some examples of irregularities.

1. A procedure by a teacher or student which is inconsistent with the procedures described.

2. A request for a student in a grade other than those listed in the Project Resource File.

3. A request for assistance which is inconsistent with the resource person's commitment as it currently appears in the Project Resource File.

PROJECT RESOURCE FILE

CONFIRMED OUTSIDE RESOURCES FOR 1980-81

INFORMATION SHEET

CONTACT	DATE MAILED / DATE RECEIVED	COMMENTS

APPENDIX O (CONTINUED)
LETTERS AND REPORTS USED TO ADD RESOURCES TO THE PRF
(To record confirmed resources)

APPENDIX P

EXAMPLE OF PRF COMMUNITY RESOURCE SHEET

GRADE: 3-8

TOPIC: LAB SKILLS - NATURE OF SCIENCE, MATTER

CATEGORY: MENTORS

CONTACT: MR. _____
STRUCTURAL ENGINEER

ADDRESS: DAVID W. TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER
SUBMARINE STRUCTURES, CODE 1720.1
BETHESDA, MD 20084

TELEPHONE: _____(OFFICE)
_____(HOME)

HOURS: 6:30 AM TO 3:00 PM, WEEKDAYS (OFFICE)
4:00 PM TO 9:00 PM, WEEKDAYS (HOME)

SPECIAL INSTRUCTIONS: CALL MR. _____ AT WORK, DISCUSS THE STUDENT'S INTERESTS, AND ARRANGE A STUDENT APPOINTMENT AT A SITE HE DESIGNATES. MR. _____ PREFERS TO MEET AT THE STUDENT'S HOME. HE WILL TRAVEL TO HOMES IN MCPS AREAS 3 AND 4, PROVIDED THEY ARE WITHIN A REASONABLE DISTANCE OF HIS HOME IN ROCKVILLE. IF HE CANNOT BE REACHED, LEAVE A MESSAGE OR CALL HIM AT HOME. IT WILL BE HELPFUL TO SUGGEST TIMES WHEN YOU CAN BE REACHED.

DESCRIPTION: MR. _____ WILL MEET WITH THE STUDENT TO DISCUSS CHEMISTRY TOPICS RELATED TO THE STUDY OF METALS. HE WILL PROVIDE INFORMATION AND, IF APPROPRIATE, SUGGEST READINGS, ACTIVITIES TO CARRY OUT AT HOME, OR OTHER RESOURCES TO PURSUE. MR._____ MIGHT CONDUCT A DEMONSTRATION FOR THE STUDENT AND/OR PROVIDE A TOUR OF FACILITIES AT THE RESEARCH AND DEVELOPMENT CENTER.

MR. _____ IS TRAINED IN METALLURGY. HIS WORK INVOLVES DESIGNING AND DETERMINING THE USE OF MATERIALS RELATED TO DEEP-SEA SUBMERSION.

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

October 1, 1979

APPENDIX Q
MEMORANDUM IDENTIFYING TASKS GSP STAFF WOULD DO IN SCHOOLS TO ENCOURAGE USE OF THE PRF

MEMORANDUM

To:

From: John R. Pancella, Coordinator, Secondary Science and Project Director, Gifted Science Project, 279-3500

Subject: Continuation of the Gifted Science Project Tryout

Last spring your school helped us begin the tryout of the Gifted Science Project. We appreciated your cooperation and assistance and look forward to your continued participation this year. We anticipate that the tryout schools will make greater use of the revised and expanded version of the Project Resource File.

The tryout period will end in January 1980. We are encouraging as much use as possible of the Project Resource File and project staff so we may meet the obligation of our development grant. We urge schools to make maximum use of the resources we have identified for individual gifted students. The project staff members are inviting teachers to call for any assistance they wish. In order to make it easier for teachers to use the Project Resource File, the staff will assist teachers to do the following.

1. Interview a student to determine his/her interest.
2. Match the student interest with a topic, resource category, and resource in the Project Resource File.
3. Arrange for the possible use of the resource.
4. Complete the evaluation reports and other records when the Project Resource File is used.

In addition to the above, the project staff will be available for staff in-service training and teacher consultations. They will work closely with the media center staff who will have the Project Resource File in your school and the supply of materials that accompanies it.

In the next few days, the staff will contact your school to arrange for the delivery of these materials.

1. Revised Project Resource File.
   Since last spring the project staff has considerably expanded the number of resources in the file. All topics and objectives in the Program of Studies for Grades 3-8 are represented. A microfiche set of the resource file will be left in each school's media center for the entire school year 1979-80. Although the tryout period will end in January 1980, the file will be left for school use until the end of the school year.

NUMBER OF RESOURCES IN THE PROJECT RESOURCE FILE

Resource Categories	First Edition February 1979	Second Edition September 1979
Activities	16	60
Awards and Competitions	0	1
Career Information	1	63
Courses, Lectures, Seminars	3	8
Libraries	2	6
Mentors	41	92
Project Ideas	29	142
Science Processes	9	41
Visits	1	14
TOTALS (Grades 3-8)	102	427

2. Supply of report forms, mailing envelopes and in-service manuals.
   These will be left in each media center for teacher use. The same in-service manual used last spring will be used this fall. A new manual is being printed and as soon as copies are ready the project staff will exchange them for the old copies.

3. Books and media purchased for your school.
   Last spring two bibliographies were prepared for your staff to select about $300.00 of books and media described in the Project Resource File. With some exceptions, such as "out-of-print" items, these materials have been obtained and will be brought to your school.

Library cards for all appropriate items are included. A "packing" slip in each box will identify the first and second priorities that your staff identified for us to purchase (shown as "1" or "2" on the list), show the books that have been purchased (purchased items are circled), and indicate those that are not available. We do not anticipate any additional project funds for school purchases at this time. However, we will keep you informed if this changes.

Copies of the revised bibliographies are attached to this memorandum. All changes in availability, price, and other bibliographic information are on these revised lists.

4. Free materials.
We have been able to collect for each tryout school ten free materials identified in the Project Resource File. A list of these is attached. A set will be delivered when the project staff visits your school. As other free materials are obtained, they will be sent to your media specialist.

Your area staff will be kept informed of our project's activities and progress, and they will also receive the Project Resource File microfiche and in-service manual. They will be invited to become involved as much as they wish during the tryout in order to be familiar with the resource file when it is made available countywide in September 1980.

Mr. Gerard Consuegra and Mr. Michael Lawson of the project staff will continue to work with the tryout schools. Dr. David Dubois left the project to accept a fellowship at George Washington University. We expect to fill the vacant evaluation specialist position in the very near future. That person's primary function will be to collect and process the evaluation data. All three staff members will assist teachers in using the Project Resource File.

We look forward to working with you and your staff this year, and we hope that together we can help large numbers of individual gifted science students.

JRP:tb

Attachments

Copy to:

APPENDIX R
EXAMPLE OF PRF INDEX SHEET

INDEX

GRADE 3 — ENERGY

COMMUNITY RESOURCES

RESOURCE CATEGORIES	RESOURCES	SYNOPSES	FICHE/PAGE
ACTIVITIES	MR. SEGAL	BUILD ELECTROMAGNETS	1/18
	MR. SEGAL	INVESTIGATE THE EFFECTS OF AIR MOVEMENT	1/18
AWARDS AND COMPETITIONS	MS. PROCTER	4-H PROGRAM	1/22
COURSES, LECTURES, AND SEMINARS	SMITHSONIAN RESIDENT ASSOCIATE PROGRAM	SCIENCE-ORIENTED COURSES	1/28
LIBRARIES	MISS SCOTT	AEROSPACE LIBRARY	1/34
MENTORS	DR. ACKERMAN	COMPUTERS, ELECTRONICS, PHYSIOLOGY	1/36
	DR. W. DAVIS	PHYSICS, ASTRONOMY	1/52
	DR. DIXON	PHYSICS	1/54
	DR. EVANS	PHYSICS, ASTRONOMY	1/61
	MR. GRAY	PHYSICAL SCIENCE, COMPUTERS	1/71
	DR. LAYMAN	OPTICS	1/80
	MR. MACIOROWSKI	PHYSICS, ASTRONOMY	1/84
	DR. POTTER	RADIOLOGY	1/101
	MR. SAUNDERS	AERONAUTICS	1/106
	DR. SAYRE, JR.	ENGINEERING	1/107
	DR. SCHANZLE	AERONAUTICS, ASTRONOMY	1/108
	MR. SEGAL	ELECTRONICS	1/111
	MRS. SNYDER	GENERAL SCIENCE, HISTORY OF SCIENCE	1/118
	MRS. THOMPSON	AERONAUTICS, ASTRONOMY	1/120
	MR. VENDETTI	ENERGY TRANSFORMATIONS	1/125
	DR. WILLIAMS	PHYSICAL SCIENCES	1/132
VISITS	NONE		

APPENDIX S

MEMORANDUM TO PRINCIPALS ABOUT STUDENT PARTICIPATION

GIFTED SCIENCE PROJECT
Department of Instructional Planning and Development
850 Hungerford Drive Rockville, Maryland 20850
Telephone (301) 279-3500

June 6, 1980

To: Principals, Gifted Science Project Tryout Schools, 1979-1980

From: John R. Pancella, Coordinator, Secondary Science and Project Director

Subject: Sharing Information on Student Participation in the Gifted Science Project

For each student who used the Project Resource File during the tryout period, 1979-1980, it may be useful to include a copy of this memorandum, which describes the Gifted Science Project, with the information on their participation. This information, located in the project STUDENT ENVELOPES left with your staff, may be worth sharing with each student's teacher(s) next year. Please use your judgment in deciding what information should be shared and how this can be done.

If you or your staff have any questions, please call the project office at 279-3500 or me at 279-3421.

PROJECT SUMMARY

Purpose

The Gifted Science Project was federally funded under ESEA, Title IV-C, for the identification of resources for individual gifted science students, Grades 3-8, and their teachers.

The resources are matched with topics in the Montgomery County Public Schools (MCPS) Program of Studies. They include information on scientists, scientific agencies and laboratories, print and nonprint materials, and special activities such as science awards, competitions, and fairs. The resources have been categorized and placed in a resource file.

The file makes all the resources readily available to an individual gifted student through his/her teachers. Thus the student has an opportunity for in-depth exploration in areas of his/her interest.

Project Activities

The project was funded for three years. During the first year, 1977-78, the staff collected, organized, and classified science resources. The educational activities offered by these resources were correlated with MCPS science instructional objectives, and the resource file was put on microfiche, a form of microfilm. During the second year, 1978-79, the microfiche system was installed on a trial basis in 15 public schools and one Catholic school. The project staff helped students and teachers use the system and resource file. Evaluation studies were conducted, and the data were used to revise the project materials and services.

At the conclusion of the third year of the project, 1979-80, the materials were made available countywide. Sample project materials were prepared for dissemination to interested persons outside MCPS, and the project was publicized statewide and nationally.

APPENDIX T

Division of Academic Skills
DEPARTMENT OF INSTRUCTIONAL PLANNING AND DEVELOPMENT
MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland 20850

1979-80

Dr. John R. Pancella
Coordinator, Secondary Science
279-3421

Programs for Accelerated and Motivated Secondary Science Students

Month Announced	Activity	Grade Level	Cost To Student
October	Georgetown University Science Symposium Invited student research papers	12	
October	Junior Science and Humanities Symposium, Maryland Academy of Sciences Invited student research papers	12	
October	National Engineering Aptitude Search, Junior Engineering Technical Society Test score for record	12	Yes
October	Science Talent Search, Science Service and Westinghouse Independent research report for scholarship competition and invitation to local science talent search programs	12	
October	Student Research Fellowship Program, Montgomery County Public Schools and Montgomery County Heart Association $150 stipend and summer research lab placement	9-12	
December	Earthwatch Scholarship Program Scientific field research expeditions	Ages 16-23	Yes
December	Montgomery Area Science Fair Certificates, cash, and other awards; senior division winners to International Science Fair	7-12	
December	Student Conservation Association, Charlestown, N.H. Volunteer work groups, conservation and park service	Age 16 by Aug.	Yes
January	National Explorers Scholarship Program Student applications judged by Maryland State Department of Education	10-12	
January	National Student Science Competition, National Consortium for Black Professional Development Science fair for cash and other awards	7-12	Yes

Month Announced	Activity	Grade Level	Cost to Student
February	Science Writing Contest, Society for Technical Communication Cash awards	10-12	
February	Maryland Science Talent Search, Maryland Academy of Sciences Invited papers from entries in National Science Talent Search; certificates and cash awards	10-12	
February (may not be annual event)	Student Research Grant, Washington Academy of Sciences Support for individual or group investigations	10-12	
March (may not be annual event)	Camp Experience, Catoctin National Park, Maryland Forest Service and Department of Natural Resources Conservation and park service experiences	varied	varied
March (may not be annual event)	High School Cooperative Education Program Selected agencies hire students at GS-1 rate for lab work; could lead to four-year college work scholarship	11	
March	Pre-college Oceanography Program, Marine Science Consortium, Wallops Island One week summer programs, oceanography, marine biology, salt marsh ecology	7-12	Yes
March (may not be annual event)	Science Lecture Series, University of Maryland Baltimore Campus Free tuition Saturday programs	10-12	
March	Science Training Programs Directory, National Science Foundation and participating universities/colleges (mostly summer, some academic year) More than 100 pre-college training programs	10-12	Yes
April	U.S. Department of Agriculture Science Fair Projects invited from area fairs	7-12	
April	Greater Washington Science Talent Search and Joint Board on Science and Engineering Education Awards Dinner Recognition for area students selected for National Science Talent Search and International Science Fair	10-12	
May	International Science and Engineering Fair, Science Service; Senior division winners of area fair are sponsored to city of fair; many national awards	10-12	
June	Maryland 4-H and Youth Conservation Camp "In-the-woods" 6-day program	varied	Yes

Programs with Multiple Offerings	Grade Level	Cost to Student
Chesapeake Bay Foundation and Waterfowl Research Group, John Hopkins University Courses, seminars, excursions	varied	varied
4-H Fairs Local, state, national fairs include science categories; open to 4-H members	varied	varied
Maryland Academy of Sciences, Baltimore Baltimore and local lecture series, seminars, school visit program, student research lab, small student grants	6-12 varied	Yes
Maryland Centers for the Gifted and Talented Most of the summer programs include science	5-12 varied	varied
Museum of Natural History, Smithsonian Institution Tours, docets, discovery room, naturalist center for individual self-development	varied	varied
National Academy of Sciences, Washington, D.C. Lectures, symposia	varied	varied
Nature Forays, Audubon Naturalist Society and National Museum of Natural History Trips, excursions, varied lengths	varied	varied
Summer Field Ecology Program, Audubon Naturalist Society Trips, four days to 2 weeks	Ages 12-17	Yes

Montgomery County Public Schools - Courses and Programs

Biology 2
Biology AP
Chemistry 2
Chemistry AP
Physical Science 2
Physics 2
Anatomy and Physiology
Internship - Science
Independent Study Projects (non-credit)
Laboratory Assistant (non-credit)
Science Clubs (non-credit)

Awards available for school use (non-competetive; school staff select recipient)

American Association of Physics Teachers Certificate
Bausch and Lomb Science Medal
George Washington University Engineering Medals (2)
Montgomery County Medical Society Medal
Rennselaer Polytechnic Institute Certificate

Gifted Science Project

ESEA, Title IV-C, planned for three years, 1977-1980. A Supplementary Education Service for Gifted Students and Their Teachers - Science

Project Director, Dr. John R. Pancella

A resource file of community resources and published materials for individual gifted students, Grades 3-8.

Other

Area and school-based projects

Career Days - universities/colleges

Field Trips or Open House - various agencies and institutions

National Merit Scholarship Program

University/college courses